Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
a) How well does FEMA coordinate its flood-related programs, including its mitigation activities, the NFIP, and disaster relief or assistance? How does the NFIP coordinate its efforts with other programs, agencies, and organizations concerned with land-use management, building science, and the mitigation of flood losses? If, so, with what consequences?	• Legislative or regulated directions as to the form and degree of coordination expected of FEMA's flood-related programs • Description of NFIP's coordination efforts with other programs, agencies, nongovernmental organizations, and land-use management, building science, and mitigation	• Interviews with FEMA officials and review of legislation and regulations • Survey of FEMA regional officials in each of the flood-related programs • Interviews with representatives of federal agencies • Case studies of instances and causes of successful and unsuccessful coordination • Mail survey and interviews of state and local officials and officials at the Association of State Floodplain Managers • Case studies/ field observation of coordination efforts • Interviews with the building community and state and local land managers • Identify consequences of fully or partially successful and unsuccessful coordination	• Conduct interviews with FEMA officials to determine perceptions of the agency's overall responsibilities and capabilities for coordination • Survey regional FEMA officials- degree to which FEMA has achieved measurable expectations for coordination • Interview officials from Corps of Engineers and US Geological Survey and other federal agencies- opinions on form and degree of coordination • Conduct case studies- examining mitigation and disaster relief and assistance identifying factors that promote effective coordination • Survey/ interviews state and local officials and Association of State Floodplain Managers- degree to which communities received a comprehensive and well-coordinated response to their needs • Case studies/ field observation- to verify information gathered concerning coordination efforts • Interviews with the building community and state and federal land managers • Question all respondents about specific outcomes of past efforts to coordinate their activities and how coordination can be improved	• Definition of what is acceptable and feasible levels of cooperation • Opinions of stakeholder on FEMA's coordination efforts with other programs, agencies and nongovernmental organizations, and land-use management, building science, and mitigation • Instances and causes of successful and unsuccessful coordination • Specific outcomes of past efforts to coordinate activities and suggestions for how coordination can be improved	• Model 1- Floodplain Management and the National Flood Insurance Program • Model 4- Mandatory Purchase of Flood Insurance • Model 5- Disaster Assistance and the National Flood Insurance Program • Model 7- National Flood Insurance Marketing and Communication

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
b) Are the roles of the states and FEMA properly identified, funded, and integrated within the system? Is the role of state government adequately identified and sufficiently substantive to be effective in contributing to the NFIP's goals? Has FEMA promoted the institutionalization of floodplain management and flood mitigation strategies in the states? Has FEMA federalized the nation's flood problem so that states avoid taking responsibility for the problem, or has FEMA encouraged states to develop floodplain management programs? Are there alternative institutional arrangements whereby states (or groups of states) could have their roles in floodplain management (and flood insurance) enhanced while the federal government's insurance role is diminished?	• Identification of the roles of the states and FEMA in floodplain management- preferred roles, and any restrictions that are placed on states • Identification of division of responsibility between FEMA and the federal government and states and local communities- • Alternative methods of dividing the responsibilities among various levels of government	• Organizational information, legislation, and regulations from FEMA and states • Existing FEMA/NFIP/FIMA, state, and local government records on spending on flood-related programs- mitigation, disaster assistance, insurance costs, mapping, administration, relocation/retrofitting/repair • Interviews FEMA and state officials • Survey academics and policymakers • Interviews and gathering of information from European flood officials	• Gather relevant FEMA and state organizational information, legislation, and regulations to identify roles, responsibilities, and any restriction placed on states • Update Association for State Floodplain Managers' 1992 summary of state laws and regulations governing floodplain management • Analysis of spending on flood-related programs by federal, state, and local governments, mitigation, disaster assistance, insurance costs, mapping, administration, relocation/retrofitting/repair • Time series analysis of whether availability of federal funding has increased the amount states have devoted to mitigation and floodplain management • Interviews with FEMA and state officials- division of responsibility between state and federal government; has present system allowed states to increase, avoid, or assume less responsibility; institutionalization of floodplain management at the state level; possible alternatives that allow states a greater role in floodplain management • Survey academics and policymakers- possible alternatives that allow states a greater role in floodplain management • Conduct interviews and gather information from European flood officials- national vs. local roles, institutionalization of floodplain management, alternative institutional arrangements	• Comprehensive picture of the role of states in floodplain management • Update of state laws and regulations governing floodplain management • Amount of spending by federal, state, and local governments on flood-related programs • Measure of whether availability of federal funding has increased the amount states have devoted to mitigation and floodplain management • Opinions of FEMA and state officials on role and responsibilities of state and federal governments and ways to improve the current system • Information concerning European methods of floodplain management	• Model 1- Floodplain Management and the National Flood Insurance Program • Model 5- Disaster Assistance and the National Flood Insurance Program

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
c) To what extent are states and communities implementing the NFIP's requirements for floodplain management? Does the NFIP have appropriate sanctions available when communities do not perform their floodplain management responsibilities effectively? Does it apply those sanctions appropriately? Does the NFIP monitor compliance adequately and concentrate its investigative resources to maximize the detection of communities with serious problems?	• Extent to which requirements are being implemented • Information concerning suspensions and probation • Impact of suspension or probation on communities • Opinions of communities on fairness of sanctions • Determine causes and consequences of noncompliance and reasons NFIP has not detected or acted upon noncompliance	• Review of records in selected regional FEMA offices- collecting information on implementation and suspensions and probation • Case study of 10-15 noncompliant communities and mail survey of an additional 200 to 300 communities • Survey/ interview of NFIP, state, and local officials and administrators to determine opinions on appropriations of sanctions • Identify and visit communities that retain their eligibility for the NFIP, but do not meet it requirements- using state and federal officials, and WYO and flood determination companies • Case study of Monroe County, Florida	• Collect information concerning compliance issues including- procedures used to assess compliance and enforcement, criteria used to judge compliance to be acceptable, frequency of inspections, differences among regions • Collect information concerning suspensions and probation issues including- number of notifications and suspensions, most common reasons for suspending a community's participation in the NFIP, percentage of suspended communities that regain their eligibility and the average length of time required to do so • Conduct interviews/surveys on appropriateness of sanctions • Identify and visit a sample of noncompliant communities which have not lost their eligibility- determine causes and consequences of noncompliance and the reasons the NFIP has not detected or acted upon instances of noncompliance • Conduct case study of Monroe County, Florida- represents long-term noncompliance and unsatisfactory response to FEMA's notices of program violations	• Understanding of the extent to which requirements are being implemented • Data concerning suspension and probation of NFIP communities • Opinions suspension or probation of local officials in noncompliant communities • Identification of common characteristics of communities that are suspended or notified of impending suspension • Strengths/weaknesses of suspension/probation process	• Model 1- Floodplain Management and the National Flood Insurance Program • Model 4- Mandatory Purchase of Flood Insurance

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
d) What incentives or disincentives exist to encourage (or discourage) states and communities to exceed the NFIP's minimum floodplain management requirements? Are existing incentives sufficient to promote the NFIP's objectives in a timely and cost-effective manner? If not, why? Are there additional, politically feasible and cost-effective incentives for state and local governments, builders, realtors, lenders, property owners, or others that can promote the NFIP's effort to manage floodplains efficiently and effectively? What alternatives are there to eliminate or mitigate the disincentives?	• Efficient and effective incentives that encourage states and local governments to exceed NFIP minimum requirements • New and alternative incentives to NFIP stakeholders to promote floodplain management • Assessment CRS incentive program • Disincentives and ways to mitigate their impact	• Survey of state and local officials to gather information concerning incentives programs and disincentives • Survey/interviews of NFIP stakeholders about current and potential incentives • Collect CRS data- biennial reports to Congress • Focus group of FEMA officials, state and local floodplain managers, and policymakers- to determine political feasibility and ways to mitigate disincentives	• Survey of state and local officials concerning incentives/ disincentives- which incentives encouraged them to exceed minimum standards, type of incentive, amount of benefit, projected savings, eligibility requirements for incentive • Analyze data to determine common characteristics communities which exceed minimum NFIP standards- benefit-cost ratio and qualitative data from officials • Conduct survey and interviews of stakeholders- incentive which encourage floodplain management, what areas need more incentives, what disincentives exist • Analysis of CRS data- predict which types of communities initiate different CRS-related efforts in response to the dollar value of the incentive the CRS offers • Conduct focus group to determine political feasibility, potential impacts of implementation, and ways to mitigate disincentives	• Incentives/ disincentives to encourage/ discourage state and local governments to exceed minimum NFIP standards • Knowledge of how adoption of different kinds of CRS measures would change with a change in the incentive value of each. • Politically feasible incentives to stakeholder to encourage promotion of floodplain management	• Model 1- Floodplain Management and the National Flood Insurance Program

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
e) Are the NFIP's standards for construction and building design sufficiently stringent so that losses are minimized at a reasonable cost to communities and property owners when flood damage occurs? Has NFIP responded appropriately when changes are needed in standards for building design and construction? Are the standards and incentives sufficient to protect against flood risks that may be increasing in the future?	• Identify communities that have voluntarily adopted additional floodplain measures and data concerning construction cost • Measure of the adequacy of current standards to protect with increased development and risk and NFIP institutional mechanisms concerning building standards	• Applications for CRS and input from NFIP officials and NFIP Bureau and Statistical Agent • Interviews with FEMA officials and outside building experts and surveys of local code officials	• Identify communities that voluntarily exceed standards • Collect data on construction costs for a sample of 1,000 post-FIRM properties in SFHAs and from identified exceeding communities • Analyze data to determine the average costs of losses for properties that exceed NFIP standards- the loss frequency and severity will be compared with properties and communities that have not adopted increased standards to determine any additional benefits from increased building standards • Interview FEMA officials and outside building experts and survey local code officials- how standards have changed, responsiveness to change, institutional mechanisms, etc.	• Measure of cost-effectiveness of increased NFIP building standards • Historical and organizational information concerning standards, how they change, and how they meet additional challenges	• Model 1- Floodplain Management and the National Flood Insurance Program

Evaluation Design Narrative
Area of Inquiry Number 4 – Floodplain Management and Enforcement

Question (a):
How well does FEMA coordinate its flood-related programs, including its mitigation activities, the NFIP, and disaster relief or assistance? How does the NFIP coordinate its efforts with other programs, agencies, and organizations concerned with land-use management, building science, and the mitigation of flood losses? If so, with what consequences?

Related Logic Models:
- Logic Model 1- Floodplain Management and the National Flood Insurance Program
- Logic Model 4- Mandatory Purchase of Flood Insurance
- Logic Model 5- Disaster Assistance and the National Flood Insurance Program
- Logic Model 7- Marketing and Communication

Illustrative Previous Studies:
Previous studies, reports, and articles suggest that FEMA has much progress to make in providing a well-coordinated disaster response to stricken communities. A major issue of the 20th Annual Conference of the Association of State Floodplain Managers (1996) was the need to build closer working relationships within a multigovernmental, multihazard, and multidisciplinary framework. Author David M. Neal, in the *Forum for Applied Research and Public Policy*, describes FEMA's response to Hurricane Andrew in 1992 as demonstrating much confusion and miscommunication despite the federal government's publication of a guide to future federal disaster response only four months prior to Andrew. In other areas, there have also been calls for increased coordination among various parties and stakeholders. As an illustration, a report by FEMA's Inspector General (1995) cited the need for more input from map users in reviewing mapping procedures and in determining ways to increase detail in order to make maps more user friendly. Another study identified the need to coordinate flood information from federal, state, and local sources.

Selected Approach:
The study will address these questions from the perspectives of: 1) the administrators and officials responsible for implementing flood-related programs; 2) partner agencies with whom FEMA collaborates (inside and outside of the federal government); and 3) the individuals or customers who receive the various services.

The first task in this approach will be to summarize the legislative or regulated directions as to the form and degree of coordination expected of FEMA's flood-related programs. As part of this task, the evaluation team will be required to define what constitutes acceptable and feasible levels of cooperation with respect to the NFIP, mitigation, and disaster relief and assistance. This task will require discussion with officials in FEMA in Washington to determine their perceptions of the agency's overall responsibilities and capabilities for coordination. Although FEMA can rely on precedent to explain much of what it does, the unanticipated nature of floods and the need to respond to them with little advance notice suggest that coordination of responses during disaster relief may be ad hoc and contingent on the circumstances. In other instances, however, coordination may be more routine, such as when mitigation is the issue to be coordinated.

Evaluation Design Narrative
Area of Inquiry Number 4 – Floodplain Management and Enforcement

Once the evaluation team has defined the features and desired characteristics of coordination, the information will be incorporated into a survey of FEMA regional officials in each of the flood-related programs (including mitigation activities, NFIP, and disaster assistance). The surveys will seek information from respondents on the degree to which they believe that FEMA has achieved measurable expectations for coordination within the agency and with other programs, agencies, and nongovernmental organizations, such as the Red Cross and the Salvation Army. The survey will also ask them to respond based on their own expectations and opinions for what level of coordination should or can be achieved and the legal and institutional barriers to improved coordination.

Representatives of other federal agencies, most notably the U.S. Army Corps of Engineers and the U.S. Geological Survey, will be interviewed about their opinions of the form and degree of coordination between their agencies and programs and FEMA. In each instance, those interviewed will be asked to provide specific examples in which coordination with FEMA was desirable but either did or did not occur successfully. (NOTE: It will be desirable to coordinate this evaluation task with the related work that will examine the existence and success of a unified national program for floodplain management in Area of Inquiry 1).

Based on the responses, a series of case studies will examine the instances and causes of successful and unsuccessful coordination. These case studies will examine mitigation and disaster relief and assistance and attempt to identify that factors that promoted or discouraged effective coordination.

A representative sample of state and local officials will also be asked their opinions about coordination with FEMA. With respect to coordination of disaster relief and assistance, Respondents will be selected from among communities that have been the recipient of services from more than one flood-related FEMA program (e.g., disaster relief, mitigation projects, etc.) in the past two to three years. Once identified, respondents will be asked the degree to which they received a comprehensive and well-coordinated response to their needs. Mail surveys will be used to gather information from most of these respondents, but intensive interviews in several communities are essential to collect specific information relevant to a particular community's experiences. Officials of the Association of State Floodplain Managers will also interviewed.

To verify information gathered during this process, a small number of case studies will be performed to observe and evaluate coordination efforts during and immediately after floods. A small of team of observers will be sent to evaluate how FEMA and other agencies and organizations coordinate their flood events, both riverine and hurricane. This will be a challenging task because it will be essential that the evaluation team not interfere with any disaster relief operations. Nonobtrusive participation observation is the anticipated approach.

Fortunately, much of what FEMA does, such as mitigation and developing appropriate building standards, takes place when there are no floods. Although effective coordination is crucial during flood-related disaster, effective coordination is no less important with respect to mitigation and building codes. For this reason, FEMA's coordination with the building community (e.g., state and national association of developers and architects) and state and federal land managers will also be examined.

Finally, it will necessary to identify the consequences of fully or partially successful and unsuccessful coordination. All the respondents noted above will be asked to: a) identify specific outcomes of past efforts to coordinate their activities; b) how coordination can be improved.

Strengths: The proposed approach is comprehensive, addresses an issue of critical importance, and has a high level of feasibility. In addition, the task offers considerable opportunity to identify the impediments to improved coordination and to suggest how such coordination can be achieved in the future.

Weaknesses: Expectations of the relevant stakeholders surveyed may exceed the government's fiscal or statutory ability to respond. Receiving knowledgeable answers from stakeholders assume that they are aware of the NFIP, FEMA, and what is both realistic and feasible. For example, some respondents may believe that FEMA has legal authority far beyond what the law actually allows.

Feasibility of conducting the proposed task: High
There are few methodological barriers to competing this evaluation task, and data should be readily available.

Relative priority: High
Public opinion on the ability of FEMA to provide an effective and coordinated response to victims of disasters can weigh on political debates over FEMA's operations, especially when legislators' constituents live in heavily disaster-prone areas. It will be useful for FEMA to have feedback on how well it is coordinating its flood-related programs.

Evaluation Design Narrative
Area of Inquiry Number 4 – Floodplain Management and Enforcement

Question (b):
Are the roles of the states and FEMA properly identified, funded, and integrated within the system? Is the role of state government adequately identified and sufficiently substantive to be effective in contributing to the NFIP's goals? Has FEMA promoted the institutionalization of floodplain management and flood mitigation strategies in the states? Has FEMA federalized the nation's flood problem so that states avoid taking responsibility for the problem, or has FEMA encouraged states to develop floodplain management programs? Are there alternative institutional arrangements whereby states (or groups of states) could have their roles in floodplain management (and flood insurance) enhanced while the federal government's insurance role is diminished?

Related Logic Models:
- Logic Model 1- Floodplain Management and the National Flood Insurance Program
- Logic Model 5- Disaster Assistance and the National Flood Insurance Program

Illustrative Previous Studies:
The need for improved integration of state and federal roles in floodplain management and the NFIP, as well as increasing states' roles, is well documented. As an illustration, in 1979, Campbell and Heath called for statutory changes in North Carolina to ensure that the state would play a major coordination and advisory role in land-use regulations for flood protection. The 1994 report of the Interagency Floodplain Management Review Committee, *Sharing the Challenge*, identifies the lack, in practice, of a unified national program for floodplain management. The report recommends assigning primary responsibility for floodplain management to states, and reserving for the federal government the role of providing guidance and technical and financial assistance.

More recently, Mittler (1997), in assessing responses to flooding in Georgia in 1994, recommended a National Floodplain Management Act that would create a partnership among federal, state, and local governments to counteract turf battles and help ensure positive results. In addition, he noted that if state and local governments do not develop or implement comprehensive floodplain management policies and programs, the federal government should continue to take the lead. Conrad (1998) cited the need for federal, state, and local governments to coordinate and develop predisaster hazard mitigation plans. He also recommended reducing the federal cost-share of federally supported flood control projects to 50 percent and increasing the funding for programs that provide technical assistance to states.

Selected Approach:
The main goal of this approach will be to obtain a comprehensive picture of the roles that states play in floodplain management in relation to the federal government. An initial phase of the study will gather information from FEMA and states that will identify their respective and preferred roles and responsibilities for floodplain management, and whether states are restricted by legislation or regulations in their ability to contribute to the NFIP's floodplain management goals.

To identify the financial division of responsibilities between the federal government and states, an analysis of spending on flood-related programs will identify the relative spending by federal,

state, and local governments on mitigation, disaster assistance, mapping, administration, insurance costs, and relocation/retrofitting/repair in a sample of states, some with active and effective programs and other states with less ambitious floodplain management strategies. Using the existing data, a time series analysis will probe whether the availability of federal funding has increased the amount states have devoted to mitigation and floodplain management. An effort will be made to identify the causes for increases in state spending, where appropriate.

Another study task will be to update the Association for State Floodplain Managers' 1992 summary of state laws and regulations governing floodplain management, thus allowing an assessment of change over the past decade. This assessment demonstrated considerable diversity among the states in how they perceive their roles and responsibilities. To the extent that there are other issues related to floodplain management programs not include in the earlier assessment, it will also be necessary to examine changes over time in the states' financial and institutional capacity to mitigate and recover from floods.

Interviews with FEMA and a representative sample of state officials will address four topics: a) their characterizations of the division of responsibility for flood-related programs and floodplain management between the federal and state governments; b) whether the present system has allowed states to increase, avoid, or assume less responsibility for mitigation and floodplain management; c) how the NFIP has promoted, if at all, the institutionalization of floodplain management and flood mitigation at the state level and the degree to which they perceive these efforts to be successful; and d) alternatives to the current system that would allow states to increase their role in and responsibility for floodplain management and flood insurance. Selected academics and policymakers also will be interviewed by telephone about the fourth topic.

This task involves a larger but no less important issue -- the role of government in assessing the risks of flooding, mitigating these risks, responding to floods when they do occur, and promoting a system whereby (potential) victims of floods assume some or most of the costs when they occur. Through the NFIP, the United States has adopted and implemented one approach to these issues for more than 30 years. The overall evaluation will allow policymakers and stakeholder to judge the relative success of the U.S. model.

Despite whatever successes the U.S. model may have achieved, there are other approaches to the same issue that can inform floodplain management and its implementation in the United States. Several European countries suffer floods, many of which are just as devastating and as costly as those in the United States. In 1994, for example, northern Italy suffered nearly $10 billion in economic damage from a 50-year flood. Germany is estimated to have a loss potential of $30 billion due to flooding. Consequently, these countries must address and respond to exactly the same institutional issues faced in the United States and raised in this task. Although these countries face many of the same flood-related challenges as does the United States, they do not have national flood insurance programs. The absence of such programs does not mean that these countries ignore or neglect the perils of flooding. In fact, many of the countries apply different models or approaches to mitigation and floodplain management, often with considerable success.

These successes and the institutional arrangements associated with their achievement are potentially applicable to the NFIP and provide a basis for comparison, something that is not

possible in the United States because there is only one program and most floodprone communities are already part of it.

It will useful to examine the intergovernmental experiences with floodplain management and flood-related disaster assistance in two or three European countries that have considerable experience in these areas (such as France, Germany, Italy, and the United Kingdom). This highly focused task will address issues such as national versus local roles, the institutionalization of floodplain management, the distribution of flood-related responsibilities among various levels of government, and consideration of alternative institutional arrangements. It may also be desirable to examine some issues relevant to other areas of inquiry (e.g., the reliance on all-perils insurance; national disaster funds in which contributions are mandatory; enforcement and compliance of building standards and rules governing floodplain management). In all instances, the examination should focus only those issues that are of direct relevance to the NFIP's enhanced implementation.

Strengths: This approach obtains user-focused responses by targeting surveys and interviews at the officials who operate and administer the NFIP, and who thus are the most appropriate sources of knowledge regarding how this system operates and its strengths and limitations. Examination of flood-protection programs in other countries can provide a useful basis for comparison, especially since many of the institutional issues will be similar to those in the United States.

Weaknesses: A weakness of this approach is that it will rely heavily on qualitative data from interviews with a relatively small number of respondents. Consequently, the responses for these surveys and interviews, from FEMA and state officials, might be biased based by respondents' views and opinions of the current system.

Feasibility of conducting the proposed task: High
There appear to be few, if any, methodological problems associated with the proposed study, and it should not be problem to reach a representative sample of state officials.

Relative priority: High

Evaluation Design Narrative
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Question (c):
To what extent are states and communities effectively implementing the NFIP's requirements for floodplain management? Does the NFIP have appropriate sanctions available when communities do not perform responsibilities effectively? Does it apply those sanctions appropriately? Does the NFIP monitor compliance adequately and concentrate its investigative resources to maximize the detection of communities with serious problems?

Related Logic Models:
- Logic Model 1- Floodplain Management and the National Flood Insurance Program
- Logic Model 4- Mandatory Purchase of Flood Insurance

Illustrative Previous Studies:
The NFIP enables property owners to purchase flood insurance that is generally not otherwise available. In return, communities are required to adopt and administer local floodplain management ordinances. The National Flood Insurance Act of 1968 prohibits flood insurance coverage unless an appropriate public body adopts adequate floodplain management regulations with effective enforcement and monitoring provisions. Communities must gain NFIP approval of regulations before they are eligible to receive federal flood insurance. By monitoring the adoption of local floodplain management requirements the NFIP is able to promote universal standards. The NFIP's floodplain management requirements are intended to protect lives and new construction from future flooding and promote the programs overall goals.

Problems with local governments' compliance with the NFIP's requirements are frequently noted and long-standing. In their analysis of the occupancy of floodplains between the late 1950s and the early 1980s Montz and Gruntfelt (1986) concluded that the NFIP has had its greatest success at the local level in instances in which success is easiest, but that the program is not effective where it is most needed, namely in "those communities where development is occurring and where it can be directed to less hazardous sites." To remedy this problem, the authors suggest "stronger federal requirements and sanctions are needed to bring about even enforcement of regulations."

In a study of compliance conducted after Hurricane Andrew in 1992, the Insurance Institute for Property Loss Reduction (1995) estimated that about 25 percent of the insured losses could be attributed to violations of local building codes. This percentage coincides with the findings of FEMA's Building Performance Assessment Team (1992). In South Florida, for example, fully a quarter of the $16 billion in insured losses from Hurricane Andrew were attributed to code violations.

In *Sharing the Challenge* (1994), the Interagency Floodplain Management Review Committee observed that "many communities are not enforcing their [floodplain management] ordinances adequately, often because they do not understand the program requirements or the long-term benefits of reducing flood damage." Similarly, Pasterick (1998) states that the "NFIP compliance process has identified a number of violations of program standards at the local level…" He also notes "there has never been a comprehensive assessment of the level of compliance nationwide." More recently, Anderson (2000) concluded that local authorities and laws are not being enforced as required for eligibility in the NFIP. Finally, there is also

considerable evidence that local governments themselves do not comply with the NFIP's requirement that they maintain flood insurance on public buildings that previously received public assistance (FEMA Inspector General 2001).

The application of sanctions against noncompliant communities is another important aspect of this issue. Houck (1995) discusses the sanctions that the NFIP can impose on communities for noncompliance. He concludes that suspension or removal from the program might be insufficient. In his words, "Even with an army of inspectors to review what each of the thousands of NFIP communities is doing, a sanction which merely removes a non-complying community from the program until it cleans house would, in effect, be license to get away with the maximum infractions before the inspectors arrived." Houck suggests the most effective means for ensuring compliance may be through litigation.

Selected Approach:
Community compliance with floodplain management ordinances is integral to the success of the NFIP. The previous section illustrates the lack of definitive answers concerning the level of compliance within the NFIP. This approach will examine the methods, processes, and level of success or failure of the NFIP in ensuring state and local governments effectively enforce and monitor compliance to floodplain management requirements. Accordingly, the emphasis will be on compliance with these requirements, not communities' initial adoption of them.

The recommended approach to studying the issue of community compliance will initially entail a review of the NFIP's floodplain management requirements and standards for effective enforcement and monitoring at the state and local level and the associated sanctions, notably suspensions of communities due to a lack of compliance.

A first step in understanding the extent to which communities are compliant with requirements will involve a review of NFIP records in selected regional offices of FEMA to collect information about such issues as:

- the procedures used to monitor and assess community compliance and enforcement of adopted floodplain management regulations;
- the system used to obtain feedback when the NFIP delegates monitoring of community compliance to states;
- the criteria used to judge community compliance to be acceptable or unacceptable;
- the frequency of inspections and community assistance visits;
- the criteria used to determine which communities will have their compliance assessed and the extent to which these criteria are applied consistently;
- how the NFIP assesses the effectiveness of its inspections and follows through when deficiencies or lack of compliance are identified;
- the procedures used to resolve disputes about a community's compliance and how often such disputes are resolved in a community's favor; and,
- differences in procedures, if any, among regions;
- suggestions for how the NFIP could better manage community monitoring and compliance.

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In instances of a community's noncompliance, FEMA can suspend a community's participation in the NFIP. The NFIP does so through the use of 6-month, 90-day, and 30-day notifications. If a community does not resolve its noncompliance to FEMA's satisfaction after receiving these notifications, a community can be suspended from participation in the NFIP or placed on probation if it fails to enforce floodplain management regulations adequately. During the period in which a community is suspended, its property owners lose their eligibility to purchase flood insurance through the NFIP. In addition, no direct federal financial assistance (except assistance pursuant to the Robert T. Stafford Disaster Relief and Emergency Assistance Act not in connection with a flood) may legally be provided for construction or acquisition of buildings in the identified special flood hazard area of communities not participating in the NFIP and identified for more than a year on an initial flood insurance map of the community as having flood-prone areas.

Given these possible sanctions, a second step in the evaluation will be to collect information from a sample of FEMA's regional offices about:

- The number of 6-month, 90-day, and 30-day notifications and suspensions in 1985, 1990, 1995, and 1996 through 2001.
- The average length of time between FEMA's identification of a community's noncompliance and the issuance of a six-month notification.
- The most common reasons for suspending a community's participation in the NFIP.
- The legal, administrative, or political constraints, if any, that the NFIP faces when it believes a community should receive notification of impending suspension or suspension.
- The possible risks that suspended communities impose on their property owners (e.g., is there any evidence that a community's noncompliance increases the exposure to or probability of flood damage?)
- How other federal agencies are notified and whether and how the prohibition on direct financial assistance for the construction or acquisition of buildings in special flood hazard areas of suspended communities is enforced and monitored.
- The percentage of noncompliant communities that adopt adequate floodplain management measures with effective enforcement measures after receipt of a notification but before formal suspension.
- The percentage of suspended communities that regain their eligibility and the average length of time required to do so.
- Similar information, where appropriate, about communities that are or have been on probation.
- The processes used to determine a community's eligibility for reinstatement after suspension or probation.
- How compliance information feeds back into NFIP/FEMA decision-making.

Identification of noncompliant communities and the details of their noncompliance will provide a starting point for choosing communities for approximately 10 to 15 case studies (plus a telephone survey of officials, perhaps 200 to 300, in communities that are or have been suspended or placed on probation in the past five years). The interviews and surveys of local officials will seek officials' opinions on whether the sanctions applied in their respective

communities were perceived to be fair and the result of due process. In addition, local officials in such communities will be asked to discuss such issues as:

- The consequences of suspension (e.g., How are policyholders notified? What publicity, if any, is associated with suspension?)
- Whether the communities suffered flood damage during their period of suspension or probation and with what consequences for communities and property owners.
- The reasons communities are "willing" to allow themselves to be suspended or placed on probation.
- How FEMA's monitoring of compliance can be improved.

All the discussion above implies that the NFIP effectively monitors and detects noncompliance. In fact, with FEMA's relatively limited resources and nearly 20,000 participating communities, there may be a fair number of communities that retain their eligibility for participation in the NFIP despite their lack of compliance with its requirements. Identification of such communities may be difficult, but the knowledge of state and federal officials and WYO and flood determination companies might be tapped to identify such communities (as can FEMA's records about which communities have never or rarely received a community assistance visit and information about the size or absence of an agency or department with responsibility for floodplain management). In addition, onsite visits to a random sample of communities in areas subject to high risks of flooding will be part of the evaluation process. Such visits will compare the NFIP's requirements with actual practice and performance. The evaluation team should not expect that noncompliant communities will readily identify themselves, but the team should actively seek ways to identify such communities. Once identified, the causes and consequences of noncompliance will be identified as will the reasons that the NFIP has not previously detected or acted upon instances of noncompliance.

An additional case study in Monroe County, Florida, will also be part of the study. FEMA noted deficiencies in the county's compliance in 1982, 1987, and 1995. More recently, FEMA has announced its intentions to begin a pilot inspection program designed to correct problems with improperly built enclosures. The situation in Monroe County represents an instance of long-term noncompliance and unsatisfactory response to FEMA's notices of program violations. The situation in Monroe County thus offers an opportunity to examine a situation in which thousands of people (and over 29,000 owners of flood insurance) are vulnerable to frequent flooding but in which effective compliance and enforcement are at issue.

Through the case studies and surveys, it will be possible to identify the common characteristics, if any, of communities that are suspended or notified of impending suspension (e.g., are they primarily rural or urban, poor or affluent, in coastal or riverine areas; what is their relative vulnerability to flooding; have they suffered flood damage in the recent past?)

Finally, based on the data collected from FEMA and communities, attention to the issue of compliance will address these questions:

Evaluation Design Narrative
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- How can the number of suspensions and probations be minimized while maintaining the integrity of the NFIP's efforts to ensure acceptable levels of compliance? Alternatively, are there too few suspensions or probations?
- Should the penalties associated with suspension be strengthened or relaxed? If so, why, and with what consequences?
- What are the strengths and weaknesses of the suspension/probation process? What does suspension or probation accomplish with respect to the NFIP's goals to reduce damage from floods and to minimize federal disaster assistance because of flood damage?

Strengths: This approach seeks to determine the appropriateness and effectiveness of sanctions by interviewing the state and local officials who are the recipients of sanctions. The appropriateness of the sanctions can be viewed as the degree to which they efficiently and effectively deter the noncompliant behavior. Local officials are the best respondents to questions about the effectiveness of sanctions in this manner.

Weaknesses: The weakness of this approach is that it relies on NFIP records of noncompliance. NFIP monitoring of compliance with floodplain regulations is modest in some states. Thus, records will not reflect the full extent of noncompliance. In addition, local officials in suspended communities may be reluctant to cooperate with a FEMA-funded evaluation of the NFIP.

Feasibility of Conducting the Proposed Task: High
There are many communities in which compliance can be examined, FEMA's regional offices will be able to provide much of the data, and much of the data are in public records.

Relative Priority: High
Compliance represents a fundamental assumption on which the NFIP is based. In the absence of effective compliance, lives and property may be jeopardized and large numbers of policyholders may be improperly insured, to their detriment as well as to that of the NFIP's financial soundness.

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Evaluation Design Narrative
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Question (d):
What incentives or disincentives exist to encourage (or discourage) states and communities to exceed the NFIP's minimum floodplain management requirements? Are existing incentives sufficient to promote the NFIP's objectives in a timely and cost-effective manner? If not, why? Are there additional, politically feasible and cost-effective incentives for state and local governments, builders, realtors, lenders, property owners, or others that can promote the NFIP's effort to manage floodplains efficiently and effectively? What alternatives are there to eliminate or mitigate disincentives?

Related Logic Models:
- Logic Model 1- Floodplain Management and the National Flood Insurance Program

Illustrative Previous Studies:
FEMA's 2000 report on *The Costs and Benefits of Natural Hazard Mitigation* identifies financial incentives as an important tool to reduce risks from natural hazards. The *1996 Community Rating System Biennial Report to Congress* outlines the impact Community Rating System (CRS) incentives have by encouraging local communities to increase mitigation activities. More specifically, the *2000 Community Rating System Biennial Reports to Congress* suggests that the CRS has been effective as an incentive program, citing that "the overwhelming responses from various surveys of local officials and floodplain residents indicate that the CRS is a strong catalyst for communities to undertake new activities." The report indicates that the reduction in insurance premiums accounts for about $70 million in savings annually, but does not assess the full costs and benefits of undertaking activities at the community level. As part of its *Evaluation of the National Flood Insurance Program's Community Rating System* (1998), FEMA conducted an extensive survey of local officials' opinions of the CRS, its fairness, effectiveness, and whether their participation is worthwhile. While the report lists some suggestions made by respondents on ways to improve the CRS, there is no discussion of possible incentives outside the CRS system. Nor does the report discuss disincentives that might exist both within and outside of the CRS system.

Selected Approach:
The selected approach seeks to determine incentive programs that encourage states and local governments to exceed NFIP minimum requirements. This approach will also identify disincentives, ways to mitigate their impact, and develop alternative methods to provide incentives to NFIP stakeholders to promote floodplain management.

The first step will be to survey state and local floodplain managers. The survey will gather information about which incentive programs currently encourage a community to exceed minimum requirements. The survey should collect information about the type of incentive (e.g., grant/loan, technical assistance, lower premium rates, lessened building standards, etc.), the amount of benefit (e.g., money, man hours, increased community assistance visits, etc.), projected savings from lower potential damage, eligibility requirements for incentive, and any disincentives encountered. Analysis of the data will identify common characteristics of communities that exceed NFIP minimum standards. It will also identify which incentive programs have had the largest impact on encouraging communities to exceed minimum

requirements. This will be determined by the total benefit-cost ratio of each incentive program in the communities surveyed along with qualitative data from the floodplain managers.

The next step will be to develop and distribute a survey to stakeholders. The survey should determine which incentives encourage stakeholders to promote floodplain management, what additional incentives will encourage more support of NFIP goals, what areas of the NFIP need more incentives (e.g., compliance and regulation, floodplain management and mitigation, communication and increasing awareness, technical support, land-use, etc.), and identify any disincentives in the system. During the survey and with follow-up interviews potential benefits and an approximate cost of implementing each additional or alternative incentive will be identified.

In addition, FEMA's records will be examined to ascertain the availability of data on the assessment of various alternatives and incentives, including the Community Rating System (CRS). The CRS is one of the NFIP's key incentive-based programs, so it will be important to examine the extent to which and why communities participate; what determines decisions to participate; why so many communities have chosen not to participate; and the relative attractiveness (and assumed benefits) of each level of incentives. In addition, the evaluation task will seek to determine whether different kinds of incentives within the CRS stimulate greater mitigation at the same or similar cost and the amount of change that might occur if the costs were or rewards were higher. Much of the data for this portion of the study will be based on data collected for the NFIP's biennial reports to the Congress on the CRS.

Given the relatively limited number of CRS communities, it will also be possible to determine how much change is actually made in response to CRS incentives. For example, there is some reason to believe that communities are given credit for activities already completed. Based on all the data collected a statistical analysis will allow prediction of which types of communities initiate different CRS-related efforts in response to the dollar value of the incentive the CRS now offers. This analysis will be based on such variables as community demographics, recent flooding and the amount of damage, number of flood-insurance policies per capita, geographic location, and number and percentage of parcels in special flood hazard areas. Additional variables to consider are the cost of the CRS measures to the community. It may be that measures that local governments fund are more or less likely to be adopted than ones in which the public bears the costs directly. This analysis will allow the evaluation team to examine how adoption of different kinds of CRS measures would change with a change in the incentive value of each.

Finally, the most recommended and feasible incentives within each stakeholder group will be assessed for political feasibility. This could be accomplished by conducting a focus group of FEMA officials, state and local officials, especially those with responsibility for floodplain management, and policymakers involved with NFIP decision making. In addition to the political feasibility of the incentive, the focus groups should consider the ability for the incentive to be implemented, potential impacts of implementation across NFIP areas and stakeholder groups (positive and negative), and what measures might be taken to mitigate any disincentives which have been identified.

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Strengths: This approach should identify the incentive programs that have successfully encouraged communities to exceed minimum floodplain management requirements. The approach should also generate new and alternative methods of promoting the NFIP. Finally, multiple stakeholders and target groups will be included.

Weaknesses: Successful completion of this task will require cooperation from nay stakeholders.

Feasibility of conducting the proposed task: High
Ease of access to data is high and there are few methodological problems.

Relative priority: High

Evaluation Design Narrative
Area of Inquiry Number 4 – Floodplain Management and Enforcement

Question (e):
Are the NFIP's standards for construction and building design sufficiently stringent so that losses are minimized at a reasonable cost to communities and property owners when flood damage occurs? Has the NFIP responded appropriately when changes are needed in standards for building design and construction? Are the standards and incentives sufficient to protect against flood risks that may be increasing in the future?

Related Logic Models:
- Logic Model 1- Floodplain Management and the National Flood Insurance Program

Illustrative Previous Studies:
Research has shown that building codes and strong enforcement of them can reduce damage to property. Studies by the Insurance Research Council (1989 and 1995) include state-by-state estimates of insured property values exposed to hurricanes and the added costs of making homes more hurricane-resistant. The Council's analysis of damage from Hurricane Andrew shows the strengths and weaknesses of current building code practices and enforcement and makes recommendations for improvement.

The U.S. Army Corps of Engineers' National Flood Proofing Committee (1998) provides data on how structural flood proofing measures performed when tested by actual floods. Data were collected from 12 floods throughout the United States. Specific floodproofing measures were identified and rated as either successes or failures.

Selected Approach:
This approach will be combined with the approach outlined in Area 3 question b (III (b)) to provide a comprehensive evaluation of the NFIP's building standards. This portion will address such issues as these: Will additional standards provide benefits exceeding cost? Are current standards (e.g., those on base flood elevation) adequate given that development and global climate change both can raise flood risks above historical levels? How has the NFIP responded to problems with the standards and the emergence of better floodproofing technologies?

The first two questions will be answered in conjunction with III (b) and use a similar methodology. The first step will be to identify communities that have voluntarily adopted additional floodproofing measures. This will be done using applications for participation in the Community Rating System and input from NFIP officials. As in III (b), construction costs will be analyzed for a sample of approximately 1,000 post-FIRM properties in Special Flood Hazard Areas. The data will be collected from the NFIP Bureau and Statistical Agent for the communities identified using standards that exceed the NFIP's. The data will be analyzed to determine the average costs of losses for properties that exceed NFIP standards. The loss frequency and severity will be compared with properties and communities that have not adopted increased standards to determine if there is additional benefit from increasing building standards.

The third question will be answered by gathering information about current building codes, interviewing FEMA officials and outside building code experts, and surveying local code officials. This process will examine how NFIP standards are changed, NFIP's responsiveness to demands for change, institutional mechanisms that prevent or discourage change, how the NFIP's standards compare with other building codes concerning natural disasters, and recommendations for how the NFIP should address future changes.

Given the keen interest of the Association of State Floodplain Managers in building standards and its history of recommending more stringent standards based on its members' expertise and experience, the evaluation team will also assess the feasibility, likely costs, and potential consequences of implementing the Association's recommendations (such as its recommendation that new development should not adversely impact the flood risk of existing buildings).

Strengths: This approach will assist in a determination of whether additional standards are cost-effective at reducing flood loss and whether they will be adequate in the future.

Weaknesses: A meaningful analysis of costs and benefits will require high quality data. To the extent that subjective estimates must be made of either costs or benefits, the quality of the analysis will suffer.

Feasibility of Conducting Proposed Task: Medium

Relative Priority: High
The appropriateness of the NFIP's standards for construction and building design represent a fundamental part of the NFIP's success. If the standards are insufficiently stringent, they will be ineffective during floods, with the consequence that the NFIP's liabilities will increase as will the amount of disaster assistance and, potentially, the number of victims. In contrast, standards that are too stringent unfairly penalize those whose must pay for them without commensurate benefit.

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
a) Who are the major users of information on flood risks and flood-related maps that the NFIP provides? What are their information requirements? How well does the program respond to these requirements and at what costs? Can these costs be reduced while still satisfying or exceeding perceived needs for information on the risks of floods?	• Major users of information on flood risks and flood-related maps • Users' information requirements (content, and accuracy) • Evaluation of how well the program responds to users' information requirements • Costs to provide information requirements to users • Alternatives to current practices and their cost-effectiveness	• Review Map Modernization Study • Review hits on and feedback to NFIP website map information; follow-up e-mail survey • Survey lenders, insurers, communities, and other Flood Map Service Center users to determine customer satisfaction • Obtain data from vendors and agencies involved in flood hazard information dissemination to identify alternative practices and cost effective methods	• Classify and count Flood Map Service Center users and determine their information production and distribution costs. • Conduct and analyze surveys to determine requirements, how well the program responds to these requirements, whether certain services are under-utilized, the loss if they were reduced or eliminated, and possible alternatives to current practices • Conduct cost-effectiveness analyses of current practices and alternatives • Evaluate new technologies for dissemination of flood risk information to the public	• Customer satisfaction level among users of information on flood risks and flood-related maps • Analysis of the benefits of services provided versus the costs of provision • Recommendations re potential performance enhancing and cost saving activities	• Model 2- National Flood Insurance Program Floodplain Management Assistance, Monitoring and Enforcement • Model 3- National Flood Insurance Program Risk Assessment and Underwriting

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
b) What are the advantages and disadvantages and the costs and benefits of the current system of conducting flood insurance studies and issuing and disseminating flood maps to identify and convey information on flood risks? Are flood maps the best currently available communicators of risk? If not, what would be better, considering the costs of the proposed alternatives as well as their potential impact on the NFIP's overall effectiveness? (For technological alternatives, see Question d.)	• Costs of conducting flood insurance studies • Costs of issuing and disseminating flood maps • Users' information requirements • Users' perceptions of usefulness of information received from flood insurance studies and flood maps • Possible alternatives to current practices • Cost of current practices and alternatives • Accuracy of map modernization backlog • Changes in mitigation efforts and properties subject to flood insurance mandates that will result from remapping	• Review Map Modernization study and supporting documents, the Inspector General's critique of the study, relevant Technical Mapping Advisory Council reports, and related Flood Map Service Center cost analyses • Interview FEMA Mapping staff and Flood Map Service Center staff • Surveys and focus groups with map users about ability to understand information, etc. • Review literature to identify other alternatives to communicate risk • Confer with others doing similar information dissemination (e.g., USGS, NASA) to identify alternative practices and cost effective methods • Map a random sample of 30 coastal and 30 riverine panels from the backlog list and analyze the changes they will cause	• Get costs of conducting flood insurance studies from Map Modernization Study. • Examine how much costs would change by following the Inspector General's recommendations. • Obtain costs of issuing and disseminating flood maps from Flood Map Service Center and verify them. • Review information dissemination literature. • Confer with outside experts. • Use focus groups to assess reaction to alternatives under evaluation. • Analyze existing user surveys and conduct a supplemental survey if needed to determine needs and perceived usefulness of information from flood insurance studies and maps. • Select and map a random sample of panels from the backlog and analyze the likely impact of these maps.	• Customer perceptions of usefulness of information received from flood insurance studies and flood maps • Analysis of the benefits of services provided versus the costs of provision, broken down by NFIP policyholders versus other users • Recommendations re potential performance enhancing and cost saving activities • More refined estimate of the mapping backlog and the impacts of delaying remapping	• Model 2- National Flood Insurance Program Floodplain Management Assistance, Monitoring and Enforcement • Model 3- National Flood Insurance Program Risk Assessment and Underwriting

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
c) What might be the costs and advantages of flood insurance rate maps that reflect anticipated hazards? Are such maps technically and legally feasible? Would they contribute to the reduction of flood-related damages and increases in the number of policyholders? What communities would it be cost-effective to target for anticipated development mapping?	• Feasibility, accuracy/credibility, and cost to produce flood insurance rate maps that reflect anticipated development • Advantages of producing flood insurance rate maps that reflect anticipated development • Potential ability of maps that consider anticipated development to reduce flood-related damages • Potential contributions of anticipated development rate maps in increasing the number of flood insurance policy holders • Percentage of growing communities participating in the NFIP with ordinances that exceed FEMA mandates. • Savings from a "no adverse impacts" approach to development management	• Produce a small number of experimental maps to determine feasibility and assess costs; ascertain costs of Denver and Charlotte-Mecklenburg maps • Analyze claims in areas where development increased flood frequency and severity • Survey communities re their floodplain management ordinances • Focus groups with lenders, developers, residents and businesses • Interviews with and cost estimates by FEMA mapping staff and contractors	• Meet with FEMA staff and mapping contractors to discuss the feasibility, cost, and accuracy of digitized FIRMs that consider anticipated development and are regularly updated as that development occurs • Use the information developed in answering question 5 b) • Estimate the cost of large-scale inclusion of future conditions data in rate mapping and the offsetting reduction in remapping frequency and cost • Analyze NFIP claims experience for a sample of structures remapped as flood risks due to development and the probable effects on claims costs and construction costs if the buildings had been appropriately elevated and flood resistant • Survey communities to determine if their floodplain management ordinances exceed NFIP minimum requirements • Use the survey data to estimate (1) what percent of communities might strengthen floodplain management to reduce risks from anticipated development and (2) the resulting reduction in flood response and recovery costs • Conduct and analyze focus groups that probe how often anticipated development maps might stimulate insurance purchases or slow SFHA development. • Perform a cost-benefit analysis of producing FIRMs that reflect anticipated development	• By type of community (e.g., fast growth, moderate growth, slow growth, fully built out, stagnant/shrinking; by number of developed/vacant lots; coastal vs. riverine), cost of producing FIRMS that reflect anticipated development versus advantages of producing same • Recommendations regarding communities where the NFIP should produce anticipated development rate maps	• Model 1- Floodplain Management and the National Flood Insurance Program • Model 2- National Flood Insurance Program Floodplain Management Assistance, Monitoring and Enforcement • Model 3- National Flood Insurance Program Risk Assessment and Underwriting

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
d) How can new and developing technologies improve the identification of flood hazards? How can these technologies be used to convey risk information more effectively? Does the NFIP have an organizational culture that promotes and facilitates the acquisition and use of new technologies? How does the NFIP assess the potential utility of new technologies?	• Listings of new and developing technologies that will improve identification of flood hazards in terms of topography, hydrology, or hydraulics • How these technologies can be used to convey risk information more effectively • Whether the NFIP has an organizational culture that promotes and facilitates the acquisition and use of new technologies • How the NFIP assesses the potential utility of new technologies • Tradeoff between mapping costs and accuracy with new technologies • Modernization cost estimate sensitivity to accuracy choices for maps produced with new technology • Limitations and strengths of new mapping technologies relative to traditional methods	• Review literature to identify new and emerging technology • Interview NFIP personnel and producers and users of emerging technology • Use data from question 5 a)	• Perform literature and web site review to identify potential new flood hazard prediction technologies • Conduct and analyze interviews to determine whether the NFIP has an organizational culture that promotes and facilitates the acquisition and use of new technologies, and how the NFIP assesses the potential utility of new technologies • Review NFIP's history of using emerging technology • Estimate cost-accuracy tradeoff curve for LIDAR and other emerging technologies where these tradeoffs exist • Estimate map modernization costs as a function of accuracy • Explore the accuracy needed for NFIP use versus for collateral users	• Viability of new and emerging flood hazard prediction technologies. • Determination if NFIP has an organizational culture that promotes and facilitates the acquisition and use of new technologies • Map modernization cost sensitivity analysis	• Model 3- National Flood Insurance Program Risk Assessment and Underwriting

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
e) How are detailed floodplain maps best financed? What practical and cost effective alternatives are there to fund the identification of flood hazards that would more equitably distribute costs among policyholders, states and communities, taxpayers, and private sector users? What are the advantages to communities that participate in the mapping process, thereby taking an activist approach to managing their floodplains? Does the process encourage an activist approach to floodplain management?	• How maps are currently financed • Options for financing detailed floodplain maps • Costs of identifying flood hazards • Alternative methods for equitable distribution of costs of identifying flood hazards among policyholders, states and communities, taxpayers, and private sector users • How participating in the mapping process affects communities	• Interview NFIP staff to determine current mean(s) of financing floodplain maps • Survey floodplain communities to determine costs and advantages of participating in the mapping process, as well as attitudes about actively managing floodplains • Survey other agencies providing similar information dissemination services and compile alternative cost allocation schemes • Survey states and communities to determine (1) how often bulky procurement processes would make it difficult for them to contract locally for mapping, (2) whether they have the expertise needed to monitor and quality control a mapping effort, and (3) price differences between FEMA-contracted and locally contracted mapping • Cost analysis of different alternatives	• Conduct and analyze community survey to determine costs and effects of participating in the mapping process • Review FEMA efforts to broaden sources of funding for mapping • Determine which parties are currently bearing the expense of financing floodplain maps and determine equitableness of current cost distribution • Review feasibility of applying alternative, more equitable methods for distributing cost of identifying and mapping flood hazards accounting for accuracy needs of NFIP users versus other policyholders	• Costs and benefits of communities participating in floodplain mapping process • Proportion of mapping expense borne by different parties under current and alternative cost distribution schemes	• Model 3- National Flood Insurance Program Risk Assessment and Underwriting

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
f) Does the NFIP's hazard identification function affect property values in special flood hazard areas or outside them? If so, how? Do values differ between fully compliant versus less compliant communities?	• Degree of NFIP compliance for a sample of communities with SFHAs. • Sample of parcels sold over the past 5 years in special flood hazard areas, other flood hazard areas, and areas outside floodplains of these communities. • For sampled parcels, sales price, neighborhood characteristics (average age and income of residents, percentage of rental housing), and building characteristics (house size; house age; lot size; number of bedrooms; wood, brick or other construction; elevation above expected flood heights, distance from the nearest water course, flood risk).	• Use data from the Heinz Center study of erosion impacts on property values in coastal areas • Buy data from tax assessors, real estate sales tracking services (e.g., Rufus Lusk, Donnelly) and/or flood hazard determination firms (e.g., TransAmerica) • Add Census data • Gather community compliance data from state and FEMA regional staff	• Obtain the erosion study data regressions analyzing the impact of elevation above base flood on property values • Select three preliminary samples of riverine communities • Develop a compliance assessment instrument • Obtain community compliance data for each sample, use the sample with the most balanced distribution of compliance levels. Tabulate compliance levels for erosion study communities and determine if that sample needs to be supplemented • Obtain building characteristics and sales prices for recent sales in the sample communities • Add Census data on neighborhood characteristics. • Compare property values by degree of NFIP compliance	• Difference, if any, between property values for properties in SFHAs, other flood hazard areas, and areas not in floodplains • Difference, if any, between property values in fully compliant versus less compliant communities • Impact of remapping into or out of SFHAs on property values.	• Model 1- Floodplain Management and the National Flood Insurance Program

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
g) Considering topology, hydrology, and hydraulics, how accurate and current, on average, are the risk data shown on the program's maps? Are communities aware that not all flood risk areas have been studied or mapped, and that these areas are subject to flooding? Is there an awareness that areas outside of special flood hazard areas are also subject to flooding? What is the best way to communicate this risk? What are the impacts of inaccurate and dated information on the NFIP and on states and communities?	• Age and accuracy of floodplain maps • Validation of community assessment of maps needing update • Communities' awareness that areas outside of special flood hazard areas are subject to flooding • Impacts of inaccurate and dated information on the NFIP and on disaster losses	• Use Map Modernization Survey data • Update with Flood Map Service Center data as needed • Use FEMA's community surveys about mapping needs • Conduct community focus groups probing awareness and risk communication	• Validate selected Map Modernization Study estimates • Conduct focus groups • Draw stratified sample of flood maps by age excluding recent maps • Validate sampled maps • Use the simulation model developed for Area of Inquiry 2 to estimate the expected losses from SFHA development that occurs without mitigation because of missing or antiquated maps	• Age distribution of floodplain maps • Accuracy of anticipated flood elevations • Accuracy of anticipated bounds of floodway and SFHA • Accuracy of community assessments of updates needed • Community awareness that areas outside of special flood hazard areas can flood • Estimated losses due to outdated maps and unmapped areas	• Model 2- Floodplain Management Assistance, Monitoring and Enforcement • Model 3- National Flood Insurance Program Risk Assessment and Underwriting • Model 7- National Flood Insurance Marketing and Communications

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
h) What are the implications of making the 1%-probability flood a threshold for mandatory insurance purchase and flood management ordinances? Specifically, how has this choice affected construction in floodplains, property values, NFIP loss experience, mapping costs, and federal flood disaster expenses? What probability levels capture 90%, 95%, and 99% of disaster costs? What impacts would result from shifting to one of those probabilities as a threshold (selecting the probability based on the steepness of the fall-off in the damage curve)?	• Federal flood disaster cost distribution for 1991-2000 by flood probability • Total disaster costs • Candidate mapping thresholds • Cost of mapping and map amendments by threshold • Mitigation costs • Development and property value information for selected communities • Flood insurance claims data • Estimated mapping backlog, annual map amendment costs, NFIP sales and rates, federal flood disaster costs, and total flood disaster costs if the threshold probability was associated with 90%, 95%, and 99% of damages.	• Disaster cost data base analysis, possibly supplemented by HAZUS runs • Interviews with and cost estimates by FEMA mapping staff and contractors • Disaster loss simulations using the model developed in Area of Inquiry 2 • Data and analyses from questions 3 (b) and 4 (e) on mitigation costs • Development impact analyses from the literature and the data and analyses in question 1 (c) • Actuarial analysis • Case studies of selected communities	• Using disaster data, directly or with HAZUS, analyze damage by flood probability and alternative thresholds for analysis • Design case studies • Select 20 communities for case study of development and property value impacts • Analyze mitigation costs by differential between contour and criterion flood elevations • Conduct case studies • Supplement case studies with real estate investment modeling as necessary • Analyze NFIP claims data to estimate impact on rates of changing mitigation threshold and mandatory purchase threshold • Analyze disaster data, directly or with HAZUS, to estimate impacts on disaster costs of changing mitigation threshold	• Impact on construction costs, development in SFHAs and other parts of floodplains, property values, flood insurance premiums, federal disaster costs, and total disaster costs if flood plain ordinances and insurance purchase mandates used the alternative thresholds	• Model 2- Floodplain Management Assistance, Monitoring and Enforcement • Model 3- National Flood Insurance Program Risk Assessment and Underwriting • Model 4- Mandatory Purchase of Flood Insurance • Model 7- National Flood Insurance Marketing and Communications

Evaluation Design Narrative
Area of Inquiry Number 5 -- Hazard Identification and Risk Assessment

Question (a):
Who are the major users of information on flood risks and flood-related maps that the NFIP provides? What are their information requirements? How well does the program respond to these requirements and at what costs? Can these costs be reduced while still satisfying or exceeding perceived needs for the information on the risks of floods?

Related Logic Models:
- Logic Model 2 - National Flood Insurance Program Floodplain Management Assistance, Monitoring and Enforcement
- Logic Model 3 - National Flood Insurance Program Risk Assessment and Underwriting

Previous Studies:
FEMA's Map Modernization initiative identified its map customers, what they use the products for, and what they want to see. This information is summarized in the reports of the Technical Mapping Advisory Council (2000). The information was compiled through discussions with the organizations participating in the Technical Mapping Advisory Council, state, community, and archives-customer surveys about map needs and uses, and a review of related web site hits. Although the NFIP has unit cost information for maps, much of it is confidential and protected by federal procurement rules, so little has been published about unit costs. The Technical Mapping Advisory Council estimated the aggregate cost of map modernization and the FEMA Inspector General's office (2000) closely reviewed their methods, data, and assumptions. FEMA staff report they are validating the modernization model's unit costs by comparing its projections to the actual costs of newly completed studies. The Technical Mapping Advisory Council probed ways to reduce the mapping costs through technology and factored the reductions into its cost estimates. One concern about the cost estimates is that the cost for maps produced with advanced technologies is based on mapping standards developed by a FEMA mapping contractor. These standards require much greater accuracy if advanced technologies are used than if the maps are produced conventionally. Whether the ability to cut modernization costs by modestly relaxing these standards, but still producing a substantially more accurate map than would result from prior methods should be evaluated.

To increase flood map uniformity and responsiveness to user needs, FEMA has developed guidelines governing the technical requirements, coordination efforts, documentation activities, and product specifications for flood mapping (FEMA, 1999).

Selected Approach:
The Technical Mapping Advisory Council reports and the Map Modernization study can be viewed as largely in-house evaluation of the questions in Area 5. The issues for this evaluation design, then, are when to rely on this evaluation and when to update it or make a more arm's-length assessment. Thus, the first step in determining who uses FEMA flood insurance maps will be to review the information already gathered on this question. The state, community, and archive-customer survey information seems to picture the user groups well. If the information on other groups is not recent enough or scientific enough,

further data will be gathered from: (1) the address profile of hits on the FEMA website's map look-up and order sections and (2) surveying recent archives customers of FEMA's Flood Map Service Center. An e-mail survey of website users probably would be the most cost-effective data collection mechanism. The survey would probe information uses and associated content and accuracy needs, how well existing products meet the needs, and mapping program responsiveness. The e-mail survey would be supplemented by (1)a few questions added to broader surveys of lenders and insurers that power other parts of the evaluation and (2) telephone interviews with a sample of 30 flood determination firms.

The Technical Mapping Advisory Council explored ways of providing the needed information more cost-effectively. Again, their efforts to identify alternatives could be supplemented by interviews with additional mapping and information dissemination experts. At a minimum, the evaluation effort will need to integrate a description of the Technical Mapping Advisory Council methods and findings.

If a further cost-effectiveness analysis is desirable, costs of map distribution will be computed from FEMA contracts. The raw data required are confidential and must be carefully protected.

Feasibility of conducting the proposed task: High
These questions are reasonably straightforward.

Relative priority: Low
Especially on updating users/uses, which has been recently assessed.

References:

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Evaluation Design Narrative
Area of Inquiry Number 5 -- Hazard Identification and Risk Assessment

Question (b):
What are the advantages and disadvantages and the costs and benefits of the current system of conducting flood insurance studies and issuing and disseminating flood maps to identify and convey information on flood risks? Are flood maps the best currently available communicators of risk? If not, what would be better, considering the costs of the proposed alternatives as well as their potential impact on the NFIP's overall effectiveness? (For technological alternatives, see Question d.)

Related Logic Models:
- Logic Model 2 - National Flood Insurance Program Floodplain Management Assistance, Monitoring and Enforcement
- Logic Model 3 - National Flood Insurance Program Risk Assessment and Underwriting

Previous Studies:
Although at least two studies have issued recommendations for improving the current system for issuing flood maps, no research has explored alternative communicators of risk. With regard to the costs of issuing and disseminating flood maps, an audit conducted by the Office of the Inspector General (IG) found that FEMA's map modernization cost estimate was flawed. In some cases, the IG felt FEMA did not establish a sound basis for some of its assumptions, did not verify data, used unreliable cost data, and failed to factor in savings from adopting new technologies. The report recommended that FEMA validate its mapping needs for mapped and unmapped communities, and track costs of map modernization so actual cost data will be available for future cost estimating. In addition, it recommended factoring new flood study and terrain data collection techniques into the cost estimate, and that the cost impact of partnerships with State and local governments, new mapping techniques, and technological advances be included in the Flood Map Modernization Plan (FEMA, 2000).

In its 1999 Annual Report, the Technical Mapping Advisory Council (2000) recommended that FEMA: (1) encourage and support use of future land-use conditions in calculating floods and delineating floodplain limits; (2) strive to improve floodplain delineations that were derived by approximate study methods and mapped as Unnumbered A-Zones; (3) support the use of the recently-issued study guidelines for mapping alluvial fans; (4) develop and implement procedures for including data in DFIRM products about multiple hazards that pose flood risks, (5) continue to participate in the Open GIS Consortium to provide links to other sites containing retrievable data affecting flood risks; and (6) establish an indexing and retrieval system for archived data.

Selected Approach:
The Map Modernization Study and the Technical Mapping Advisory Council have touched on the questions raised here. The first step in addressing them is to review the relevant reports and talk with FEMA staff and contractors. Next the study team should analyze the cost estimates from the Map Modernization Study to determine roughly how much they would change by following the Inspector General's recommendations. Costs

of issuing and disseminating maps also should be obtained from the Flood Map Service Center and verified.

Other than better accounting for the potential savings from new technology (see question d below), the centerpiece of a cost validation will be an assessment of the realism of the mapping backlog. To make this assessment, 30 coastal and 30 riverine panels will be randomly selected from the backlog and mapped or updated. The map panels produced will account for anticipated development based on local expectations. FEMA has been developing a systematic approach to determining expected development in its recent anticipated development mapping efforts in Charlotte-Mecklenburg and Denver. An analysis then will be conducted of:

- How much anticipated floodplain development would be subject to more stringent flood mitigation requirements with the updated map (or new map if the selected panel has never been mapped before), how much would be subject to less stringent requirements, and how much would be in XR zones that have no mitigation requirements?
- How many developed parcels and undeveloped acres would enter the SFHA with the updated map and how many would be removed?
- How many properties would face stricter rebuilding requirements if substantially damaged in a flood and how many would face less stringent requirements?

Existing user surveys and a supplemental survey, if needed, will be used to better understand user content and accuracy needs, user ability to understand information from current flood insurance studies and maps, and the perceived usefulness of current maps. This analysis will analyze how much of the use serves NFIP policyholders exclusively, primarily, modestly, or not at all. ***An important policy issue here is whether NFIP policyholders are inequitably being forced to fund map accuracy or update that almost exclusively will serve other users.*** A review of the information dissemination literature and interviews with others doing similar information dissemination (e.g., USGS, NASA, the CA earthquake program) will guide the identification of alternative practices and potentially more cost effective risk communication and methods dissemination media and methods. A primary focus here will be on alternatives that address existing user concerns. Cost estimates to adopt these practices and use them on an ongoing basis will be developed. User focus groups will be asked to compare the acceptability of current products and samples of the alternative risk communications.

Feasibility of conducting the proposed task: High
High for validating the mapping needs. Low for finding alternatives of value. Possible alternatives have been studied extensively already.

Relative priority: Medium
Medium to high for mapping backlog validation. Low for other tasks given their feasibility.

References:

Federal Emergency Management Agency (FEMA) (2000). Audit of FEMA's cost estimate for implementing the flood map modernization plan. Washington, DC, Federal Emergency Management Agency, Office of Inspector General.

Technical Mapping Advisory Council (2000). 1999 Annual Report. Report to James Lee Witt, Director of the Federal Emergency Management Agency. Washington, DC, Federal Emergency Management Agency (FEMA).

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Question (c):
What might be the costs and advantages of flood insurance rate maps that reflect anticipated hazards? Are such maps technically and legally feasible? Would they contribute to the reduction of flood-related damages and increases in the number of policyholders? What communities would it be cost-effective to target for anticipated development mapping?

Related Logic Models:
- Logic Model 1- Floodplain Management and the National Flood Insurance Program
- Logic Model 2 - National Flood Insurance Program Floodplain Management Assistance, Monitoring and Enforcement
- Logic Model 3 - National Flood Insurance Program Risk Assessment and Underwriting

Previous Studies:
No studies were found that directly address this question. FEMA staff, however, reported that the General Counsel has determined that the hydrologic analysis underlying flood insurance rates must represent actual risks, not anticipated and therefore potentially speculative ones. Nevertheless, as watersheds are developed and more surface is paved, flood risks rise and SFHAs spread beyond their mapped boundaries. For Charlotte-Mecklenburg and Denver, FEMA prepared or is preparing flood insurance rate maps (FIRMs) that identify shaded X zones which will become SFHAs as anticipated development proceeds. The localities supplied the anticipated development data and paid the extra costs to create these maps. They will use them to assure the new development is adequately protected against flood risks. With the shaded zone, the need for future remapping is greatly reduced and maps stay reasonably current. Thus, accounting for anticipated development should reduce mapping costs in the long term.

Selected Approach:
To analyze the accuracy of FEMA's mapping backlog and the value of clearing it, we proposed that question 5 b) develop 60 randomly selected map panels that include anticipated development. If that effort will proceed, it will form the information centerpiece for evaluating the cost and value of anticipated development maps.

Evaluation of these maps will start with meetings with FEMA staff and mapping contractors to discuss the feasibility, cost, and accuracy of digitized FIRMs that consider anticipated development and are regularly updated as that development occurs. Based on these discussions and accumulated experience producing maps that consider future conditions, the evaluation team will estimate the costs of a large scale effort to include shaded X zones. The team also will estimate the offsetting reduction in remapping frequency and cost. A critical question here is the accuracy of community anticipations of future development. Accuracy will be assessed through (1) a review of the initial anticipated development mapping efforts to appraise how FEMA and the participating communities have standardized the anticipated development information and (2) interviews with participating community officials and developers or major landowners to assess the uncertainty level of this information.

If anticipated development mapping appears credible, the team next will assess the likely effects on construction costs if buildings had been appropriately elevated and flood resistant and on claims costs. If sequenced appropriately, the data from the map backlog validation will provide a good starting point. Estimating likely impact also requires determining how many communities would be likely to use the data and what savings would result. The analysis will assume that communities would pass an ordinance requiring consideration of anticipated development if and only if their current floodplain management ordinance exceeds NFIP minimum requirements. It also assumes an incentive to pass these ordinances would be incorporated in the Community Rating System (CRS). Questions about whether communities' ordinances exceed FEMA requirements and about the likelihood of using anticipated development maps of they were available should be included in a community survey that collects data for multiple evaluation sub-studies.

Two tasks will assess the likely benefits by type of community (e.g., fast growth, moderate growth, slow growth, fully built out, stagnant/shrinking; by number of developed/vacant lots; coastal vs. riverine). First, by analyzing NFIP claims for newly developed structures that entered SFHAs on remapping, the team will estimate the probable reduction in claims and rise in construction costs if the structures had been appropriately elevated and flood-resistant. Second, focus groups with lenders, developers, residents and businesses in growing communities with partially or fully developed SFHAs will probe how often anticipated development maps might stimulate insurance purchases or slow development in shaded X zones. All this information will be combined to develop a benefit-cost or cost-effectiveness analysis that suggests which communities, if any, are sensible candidates for anticipated development mapping.

Feasibility of conducting the proposed task:
High

Relative priority:
High

Question (d):
How can new and developing technologies improve the identification of flood hazards? How can these technologies be used to convey risk information more effectively? Does the NFIP have an organizational culture that promotes and facilitates the acquisition and use of new technologies? How does the NFIP assess the potential utility of new technologies?

Related Logic Models:
- Logic Model 3 - National Flood Insurance Program Risk Assessment and Underwriting

Previous Studies:
A wealth of information is available with regard to using new and developing technologies to improve the identification of flood hazards in terms of topography, hydrology, or hydraulics. FEMA staff believe they are considered the leaders in applying emerging technologies to reduce mapping cost and improve accuracy. The literature lends credence to this claim. In 2000, FEMA and NASA teamed to use NASA's science, technology and remote-sensing research in emergency management and disaster prevention activities. The technology is to be used to update flood maps, which will improve disaster recovery and mitigation by states and local communities throughout the United States (FEMA, 2000). Reeve (1998) investigated the use of probabilistic techniques to estimate flooding caused by wave overtopping and the resulting uncertainties. Zhao and Mays (1996) developed FEMA's new alluvial fan method that computes the mean and standard deviation for the 100-year discharge at any point on the fan and the mean and standard deviation for the fan area width and obtain the risk that the 100-year discharge will exceed the discharge capacity of hydraulic structures on the fan. Hamlin (1994) discusses a probability system to increase accuracy in determining whether a property is in a special flood hazard area. The probability system uses a Geographic Information System with two distinct layers of information -- a flood map layer and a secondary source street map layer -- to create digitized maps. Green (1999) discusses procedures used by the Corps of Engineers to estimate expected benefits of proposed flood damage reduction plans using risk and uncertainty analysis.

In addition, FEMA states they actively promote and facilitate the acquisition of new technologies through their Mapping Activity Statement Templates for Cooperative Technical Partners Initiative (FEMA, 1999). The templates can be used directly or as guidelines for the development of specific agreements between FEMA and its partners.

Selected Approach:
Some of the issues raised here are being addressed by a federal interagency task force. Others can be settled readily by interviewing key informants. These interviews will probe FEMA attitudes toward new technology and their success at applying it. They also will identify emerging technology that can be used in mapping. FEMA already has tested much of this technology. FEMA's demonstration mapping efforts reveal technology

limits and potentials. Importantly, they yield cost and accuracy data that are used to estimate the potential impacts of technology on mapping cost and accuracy.
Our preliminary explorations suggest the need for one analytic task as part of the evaluation. Several highly promising mapping aids are emerging in the topography area (e.g., LIDAR, IFSAR). The cost of these technologies, however, can be sensitive to the map accuracy required. Even low-cost LIDAR, for example, is perhaps two orders of magnitude better than with current photogrammetric methods. FEMA has established a stringent accuracy standard for these new technologies, which underlies the map modernization cost estimate. One source we interviewed suggested the remapping in North Carolina might have been 25% less expensive with a less stringent LIDAR standard. That claim demands careful analysis. To analyze the issue, data will be sought from advanced technology users about how their costs vary with accuracy requirements. These data will be used to perform a sensitivity analysis on the modernization cost estimate. ***The critical issue here is not just the most cost-effective accuracy requirement from society's viewpoint but also from the viewpoint of the NFIP policyholders who primarily fund the mapping. If others need a higher accuracy standard, they should fund the cost differential.***

Feasibility of conducting the proposed task: High.
Expert opinion is readily sought and should resolve many of the questions.

Relative priority: High, mixed.
The reassessment of accuracy standards is of extremely high priority. It is being handled by an interagency task force, but that task force may be oriented to accuracy needs of users other than the NFIP policyholders who primarily are paying for the maps. Contract support for that effort probably should not come from a mapping contractor with a vested interest in the outcome. The other tasks seem unlikely to yield information of much value and are of low priority.

References:

Federal Emergency Management Agency (FEMA) (1999). Mapping activity statement templates for cooperative technical partners initiative. Washington, DC, Federal Emergency Management Agency (FEMA).

Federal Emergency Management Agency (FEMA) (2000). NASA joins FEMA's project impact effort. Washington, DC, Federal Emergency Management Agency (FEMA).

Green, R. H. (1999). Risk-based analysis for flood damage reduction studies engineer manual. Collingdale, PA, DIANE Publishing Company.

Hamlin, M. (1994). "Avoiding liabilities downstream." Mortgage Banking **55**: 111-126.

National Research Council (2000). Risk analysis and uncertainty in flood damage reduction studies, Committee on Risk-Based Analysis for Flood Damage Reduction, Water Science and Technology Board, National Research Council.

Reeve, D. E. (1998). "Coastal flood risk assessment." Journal of Waterway, Port, Coastal and Ocean Engineering **124**(5): 219-28.

Zhao, B. and L. W. Mays (1996). "Uncertainty and risk analyses for FEMA alluvial-fan method." Journal of Hydraulic Engineering **122**(6).

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Question (e):
How are detailed floodplain maps best financed? What practical and cost effective alternatives are there to fund the identification of flood hazards that would more equitably distribute costs among policyholders, states and communities, taxpayers, and private sector users? What are the advantages to communities that participate in the mapping process, thereby taking an activist approach to managing their floodplains? Does the process encourage an activist approach to floodplain management?

Related Logic Models:
- Logic Model 3 - National Flood Insurance Program Risk Assessment and Underwriting

Illustrative Previous Studies:
The Map Modernization Plan (1997) recommends a major increase in map funding. It concludes that it is impractical to expect existing NFIP policyholders to continue to fund most mapping when many others use the maps. Consequently, FEMA has repeatedly floated proposals in Congress to change how FIRMs are financed. Congress agreed to permit limited use of disaster recovery funds for mapping. The recently launched Cooperative mapping program also has succeeded in leveraging state and local map funding. Congress, however, has resisted FEMA proposals that borrowers who are not in SFHAs should contribute to mapping costs, ignoring arguments that FEMA maps are used to determine that they do not have to buy flood insurance.

In 1997, FEMA designed a plan to modernize its flood map inventory. To increase local involvement in and ownership of the flood mapping process (and thereby promoting an activist approach), the Cooperating Technical Community (CTC) concept was developed. Objectives of the CTC include (1) to recognize the contributions that FEMA's partners (states, regional agencies and communities) make by providing FEMA with timely and accurate flood hazard information; (2) to fully integrate contributing partners into the mapping process; and (3) to provide training and technical assistance (FEMA, 1999).

Selected Approach:
This question has two distinct parts. One deals with the financing of insurance maps. The second probes the gains from increasing community involvement in the mapping process.

The first step in addressing the financing question is a review of the existing efforts. These include the funding equity analysis in the Map Modernization Study and FEMA's other recent financing proposals. Comparing map funders with map users will reveal potential sources for funding. That comparison will help to guide identification of alternative ways to obtain funding from users who currently do not contribute. A particular concern is whether the users with the greatest need for accurate map detail and currency are footing the bill to meet those needs. Finally, the political feasibility and administrative burden of each alternative will be rated.

The advantages to communities of actively participating in the mapping process and the costs of this participation will be determined with a survey of officials in communities

that have actively participated or recently declined to do so. A critical question to analyze with the survey data is how often active participation leads to an activist approach to floodplain management and how often it is a defensive action aimed at containing the area designated as a SFHA. A concern about moving mapping responsibility below the Federal level is the problems that other governments might have in managing the mapping process. Survey data from states and communities will be used to assess (1) how often bulky procurement processes would make it difficult for them to contract locally for mapping, (2) whether they have the expertise needed to monitor and quality control a mapping effort, and (3) price differences between FEMA-contracted and locally contracted mapping

Feasibility of conducting the proposed task:
Low to medium. FEMA has repeatedly failed to find a politically acceptable financing mechanism, so the likelihood of an outside evaluator succeeding is questionable.

Relative priority:
High. The mapping backlog cannot be overcome without increasing funding. That makes it imperative to find new ways to finance mapping.

References:
Federal Emergency Management Agency (FEMA) (1999). Cooperating technical community (CTC) guidance document. FY 2000-2001. Washington, DC, Federal Emergency Management Agency (FEMA).

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Question (f):
Does the NFIP's hazard identification function affect property values in special flood hazard areas or outside them? If so, how? Do values differ between fully compliant versus less compliant communities?

Related Logic Models:
- Logic Model 1- Floodplain Management and the National Flood Insurance Program

Previous Studies:
The H. John Heinz III Center for Science, Economics, and the Environment (Merrell et al., 2000) analyzed the impacts of erosion and base floor elevation relative to the forecast 100-year flood in a sample of coastal communities. They found that house price is sensitive to the number of years until the shoreline will erode and reach the house. They estimate that the 87,000 houses in the 60-year erosion hazard area have lost $3.3 to $4.8 billion in property value because of the erosion threat. This loss equates to $38,000 to $50,000 per home, with the pre-erosion value averaging $430,000. [Unfortunately, I do not currently have the report appendix that describes the study's findings on the impacts of structure elevation.]

Other researchers also have documented that property values are reduced by flood hazards. Donnelly (1989) used a theoretical model of hedonic price indexes, using housing sales characteristics data obtained from a Multi-List Service cooperative. He estimated that homebuyers reduce the purchase price for houses within a floodplain by an averages of 12%. Speyrer and Ragas (1991) analyzed almost 2,000 home sales in the New Orleans, Louisiana area between 1971 and 1986. They found that location in a floodplain reduces property values, and that much of the reduction can be attributed to the cost of mandatory flood insurance coverage. In an older study, however, Zimmerman (1979) found no significant difference in property values inside and outside the floodplain, and predicted that by attempting to reduce incentives to development, the NFIP "will be facing a very difficult situation since part of its strategy involves altering the market mechanism in such a way as to reduce the marginal value to new development relative to the average value of existing structures in the floodplain" (p. 1664).

Selected Approach:
The impact of broader flood hazards will be analyzed separately for coastal and riverine risks. For coastal communities, the most cost-effective approach may be to obtain the Heinz Center data set and run some further regression analyses. But the evaluation question asks for an analysis of the degree of community compliance with NFIP floodplain management provisions on property values. That makes it more complex. The first step in the study will be to contact state and regional office staff to get community compliance assessments for the communities the Heinz Center studied. A short compliance assessment instrument, probably a subset of a Community Assistance Visit or CRS checklist, will be used to assure all assessments are comparable. CRS rating also will be collected for communities with CRS ratings.

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If the Heinz Center sample does not have adequate representation of both compliant and non-compliant communities, a supplemental sample of coastal communities will be required. This sample will be drawn using a statistically pure two-step procedure that also will be used in drawing the riverine sample. In step one, three regionally stratified random samples of coastal or riverine communities participating in the NFIP will be selected. In step 2, guided by regional office and state assessments of compliance, the compliance distribution will be computed for each sample. The sample with the most appropriately balanced compliance distribution will be used in the remainder of the study. A sample of 30 riverine communities is planned. The size of a coastal sample will depend on the degree of imbalance in the current seven-community sample. The sample will be restricted to communities in an automated flood determination company database (TransAmerica or equivalent, which includes automated flood hazard data on more than 80% of improved parcels in the United States).

The data required for each community include prices and characteristics of all homes sold in the past one to five years. The time span for each community will depend on sales volume. A minimum target is 30 sales and preferably at least 100 per community, with only a random sample, stratified by location inside or outside SFHAs, needed if the community has more than 2,000 sales annually. Depending on pricing, the data may be purchased from the local tax assessor or a commercial vendor like Rufus Lusk or O'Donnell. The data sought will include parcel number, address, date of sale, sales price, lot size, house size, house type (detached, row house, townhouse, condo unit, etc.), year built, number of bedrooms, construction material (wood, brick, stone, etc.), amenities (e.g., an in-ground swimming pool, golf course membership, garage), and condition. These data will be supplemented with flood hazard rating data from the determination files. A more complete risk assessment could be made for a subsample of the properties by examining relevant flood hazard maps and capturing elevation data in the field or from community building permit files. That further assessment seems unlikely to be cost-effective.

Finally, neighborhood data will be merged onto the analysis file using 2000 Census block data linked via the geocode in the TransAmerica file. The data to be merged include average age and income of residents, percentage of rental housing, and percentage single-family structures.

Once the database is built, a regression model will be used to predict housing sales prices from the data collected. The Heinz Center study used a log-linear regression model that economists call a hedonic model because the dependent variable is the natural logarithm of housing price. While that model is fundamentally sound, it is imperfect for large scale analysis of spatial data. A more appropriate model will be used in this study that controls for spatial auto-correlation. This model recognizes that house prices are influenced by sales prices for neighboring homes. The primary predictors of interest in the model will be the home's flood risk rating and the compliance level of the community.

Feasibility of conducting the proposed task: High
This approach worked in the Heinz Center study.

Relative priority:
Medium.

References:

Donnelly, W. A. (1989). "Hedonic price analysis of the effect of a floodplain on property values." Water Resources Bulletin **25**(3): 581—586.

Merrell, W.J. Jr., S.V. Dunn, et al. (2000). Evaluation of erosion hazards. Washington, DC,H. J. Heinz III Center for Science, Economics, and the Environment Center.

Park, W. M. and W. L. Miller (1982). "Flood risk perceptions and overdevelopment in the floodplain." Water Resources Bulletin **18**: 89-94.

Richardson, H. W., P. Gordon, et al. (1991). The economic impact of FEMA flood protection and insurance requirements on ten cities in the Los Angeles County floodplain. Los Angeles, CA, University of Southern California, Planning Institute.

Speyrer, J. F. and W. R. Ragas (1991). "Housing prices and flood risk: An examination using spline regression." Journal of Real Estate Finance and Economics **4**(4): 395—407.

Zimmerman, R. (1979). "The effect of flood plain location on property values: Three towns in northeastern New Jersey." Water Resources Bulletin **15**(6): 1653-1665.

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Question (g):
Considering topology, hydrology, and hydraulics, how accurate and current, on average, are the risk data shown on the program's maps? Are communities aware that not all flood risk areas have been studied or mapped, and that these areas are subject to flooding? Is there an awareness that areas outside of special flood hazard areas are also subject to flooding? What is the best way to communicate this risk? What are the impacts of inaccurate and dated information on the NFIP and on states and communities?

Related Logic Models:
- Logic Model 2 - National Flood Insurance Program Floodplain Management Assistance, Monitoring and Enforcement
- Logic Model 3 - National Flood Insurance Program Risk Assessment and Underwriting
- Logic Model 7 - National Flood Insurance Program Marketing and Communications

Previous Studies:
Accuracy of flood maps has been an ongoing challenge for the NFIP. Mueller (1988) pointed to the lack of detailed flood data as one of the most serious impediments to effective administration of local flood damage reduction programs that was cited by community officials and state NFIP coordinating agencies. A 1995 audit found that there were zone misratings in at least 27% of its sample, and that 10% of the sample policies had incorrect premiums (FEMA, 1995).

The Map Modernization Study (1997) recently catalogued map age and mapping needs. An estimated 60,000 map panels needed updating. About 3,000 communities with flood hazard areas had not been mapped. Many of these communities had no development in the flood hazard areas and none expected. In other cases, coastal hazards have been mapped but not the risks from inland streams in the same county.

Selected Approach:
Three tasks are recommended to answer this question. The first, which may not be cost-effective, is to prospectively or retrospectively validate the need to update a small sample of the map panels identified in the modernization study. A retrospective approach would be less costly. It would examine whether remapping of panels identified in the modernization study has, indeed, substantially changed flood hazard boundaries and the acreage in SFHAs. The problem with this approach is that the panels that communities consider most in need of updating are updated, not a random sample. Thus, a prospective approach yields a more accurate picture. The mapping undertaken in validating the mapping backlog as part of question b will provide the data for a prospective analysis.

The second task is to conduct focus groups with community building and planning officials, residents, and lenders to:
- Identify better ways to communicate that many properties outside the SFHA face flood hazards and often should be insured.
- Identify better ways to identify parcels that face large enough risks to make insurance potentially cost-effective for residents and businesses

- Assess community and lender awareness of the risk of flooding in unmapped areas (recalling that fiscally responsible lenders often should require flood insurance on properties adjoining unmapped watercourses)

The third task is to exercise the simulation model built to address the questions in Area of Inquiry 2 in order to estimate the expected losses from SFHA development that occurs without appropriate mitigation because of missing or antiquated maps. Because that model will not be available for several years, it may be desirable to do some illustrative benefit computations for recent remapping by applying the mitigation benefit estimates developed in answering question 3 b).

Feasibility of conducting the proposed task: Low to medium.
Many have sought better ways to communicate risk levels outside SFHAs, looking both from the viewpoint of facilitating map use and marketing mitigation and the need for insurance. No one has found a means before so the odds are against success.

Relative priority: Medium
The exception is that an estimate of the benefits of map modernization is a high priority when the simulation model becomes available.

References:

Federal Emergency Management Agency (FEMA) (1995). Audit of the accuracy of flood zone ratings. Washington, DC, Federal Emergency Management Agency, Office of Inspector General.

Mueller, R. H. (1988). Feasibility of predicting 100-Year floodway width and depth in the Tennessee Valley by multiple linear regression. Floodplain Harmony. Boulder, CO, University of Colorado, Institute of Behavioral Science, Natural Hazards Research and Applications Information Center.

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Question (h):
What are the implications of making the 1%-probability flood a threshold for mandatory insurance purchase and flood management ordinances? Specifically, how has this choice affected construction in floodplains, property values, NFIP loss experience, mapping costs, and federal flood disaster expenses? What probability levels capture 90%, 95%, and 99% of disaster costs? What impacts would result from shifting to one of those probabilities as a threshold (selecting the probability based on the steepness of the fall-off in the damage curve)?

Related Logic Models:
- Logic Model 1- Floodplain Management and the National Flood Insurance Program
- Logic Model 3 - National Flood Insurance Program Risk Assessment and Underwriting
- Logic Model 4 – Mandatory Purchase of Flood Insurance
- Logic Model 7 - National Flood Insurance Program Marketing and Communications

Previous Studies:
The threshold level for many NFIP requirements was debated vigorously before and shortly after the program was implemented. The HUD where the program was initially housed preferred to use the 50-year (2% annual probability) flood as a threshold, while influential outsiders urged against imposing a limit. The 1% probability flood threshold emerged as a compromise. Although people continue to raise their concerns about this threshold, its impact has not been systematically evaluated.

Selected Approach:
Answering this question requires determining the influence of the 1% probability threshold, then using that information to assess the impact of choosing a different threshold. The logical thresholds to evaluate are ones that capture a specific, large portion of flood disaster costs. The impacts of interest include mapping backlog, annual map amendment costs, NFIP sales, NFIP rates, federal flood disaster costs, and total flood disaster costs. Estimating those impacts requires estimating the effects on the extent and pattern of floodplain development, property values, and NFIP loss experience. Much of that information will be determined for the current threshold in answering questions 1 c), 2 a), 2 b), 2 c), 2 f), 2 g), 3 b), and 4 e). Answering those questions also will provide tools and data needed to assess the impacts of the alternative thresholds. Indeed, the study team will approach the threshold question incrementally, assessing different aspects of its impacts in conjunction with these issue-specific studies.

The add-on studies will be supplemented by 20 case studies focused primarily on development and property value impacts. Some of the case studies will target communities or counties that already impose construction standards or restrictions with a higher threshold than the NFIP requires. The case studies will be supplemented with real estate investment modeling as needed.

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Interviews with and cost estimates by FEMA mapping staff and contractors will drive the analysis of effects on mapping and map amendment. Developer requests for map amendment, in particular, might change in volume substantially with a lower threshold.

Feasibility of conducting the proposed task: Medium
Feasibility varies among potential effects. Assessing some effects requires first answering other questions about the effects of current practices on the relevant outcomes.

Relative priority: High
The steering committee assisting the design team felt the focus on SFHAs strongly molded the first 30 years of program operations, making evaluation of this impact a priority.

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference

a) How successfully, if at all, has the NFIP been in communicating its insurance component to insurance companies, agents, adjustors, the lending industry, and the public? Has the NFIP been successful in communicating the program's current goals and requirements for floodplain management to these audiences, state and local governments, the building industry, and other concerned groups? How can the NFIP assess changes in its relative success with its communications over time?	• NFIP program goals and objectives for each audience segment
	• NFIP communication and marketing initiatives for each audience segment
	• NFIP requirements for floodplain management
	• NFIP communication and marketing evaluation policies/programs
	• Target audience knowledge, attitudes, behaviors, and perceptions regarding flood insurance and mitigation
		• Interviews with NFIP staff
		• Review of NFIP documents
		• Review of prior research conducted with NFIP target audiences
		• Focus groups/ surveys with each NFIP audience segment (e.g., public, lenders, agents, state & local government)
			• Conduct activities as listed in "How to Get Information"
			• Identify/confirm NFIP criteria for measuring success
			• Establish baseline data for all audience groups
			• Conduct research to complete baseline information (build upon previous research)
			• Analyze data sources for validating self-reported responses (e.g. web usage)
			• Conduct trend analysis on success measures over time
				• Attitude, knowledge, behavior, and perception data for each audience segment
				Specific Measures include:
				  • Perceived availability of flood insurance
				  • Perceived risk of loss due to flooding
				  • Perceived need for flood insurance
				  • High and low risk floodplain areas
				  • Website usage
				  • Toll-free number usage
				  • Awareness of information resources
				  • Experience with floods or other natural disasters
				  • Purchase of flood insurance
				• Survey instrument that may be re-administered at future points in time
				• Changes in attitudes, knowledge, behaviors, and perceptions over time
					• Model 7- National Flood Insurance Marketing and Communications

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
b) What messages has the NFIP sought to deliver to program constituents? Has the information raised awareness of the NFIP or increased the number of flood insurance policies sold? How effectively and efficiently have the messages of the NFIP been communicated to target audiences? What is the relationship between knowledge of benefits and attitudes toward the NFIP? What strategies are the most and least cost-effective in raising awareness? Are there better strategies for communicating the NFIP's messages?	• NFIP approved materials • Types of NFIP messages (e.g., mitigation, insurance) by target audience (e.g., lenders, homeowners) • NFIP communication and marketing strategies • NFIP spending on communications and promotions • Reach of promotions • Audience preferences and recall of NFIP messages • Audience perceptions, attitudes, etc. toward the NFIP and flood insurance	• NFIP sources (e.g. promotional materials, reports) • Review of documents related to current strategies (e.g. media plans, return on investment reports, Quantitative Report series) • Discussions or interviews with FIMA / NFIP staff • NFIP website • Surveys, interviews, or focus groups with target audience members	• Conduct activities as listed in "How to Get Information" • Identify/confirm NFIP criteria for measuring effectiveness and efficiency for each target group • Inventory of NFIP messages • Analyze message distribution by type and by audience segment • Interview or conduct focus groups for formative research • Conduct quantitative surveys with sample from target audiences (telephone, online, or mail) • Investigate reasons why flood insurance is purchased or not purchased • Assess the effectiveness and efficiency of communications strategies for each target audience and NFIP message • Investigate audience views of possible communication strategies	• Comprehensive list of messages and intended targets • Confirmed awareness of messages among audience segments • Correlation between message awareness and policy purchase behavior • Correlations between knowledge, attitudes, behaviors, and other variables related to the NFIP by audience segment • Estimates of cost-effectiveness for communications strategies • Return on investment (e.g., gross rating points and policies in force) for promotional strategies • Suggestions for alternative cost effective strategies	• Model 7- National Flood Insurance Marketing and Communications

Question	Information	How to Get	Tasks Involved	Outcome Measures	Logic Model

	Needed Information				Reference
c) How can the NFIP encourage its target audiences to increase their attention to the messages that it delivers? What messages have been most attended to, remembered, and/ or acted on by different target audiences?	• Number and type of NFIP Messages disseminated • Evidence of message tailoring by audience segment • Strategies and channels of message distribution (time, manner, etc.) • Audience perceptions and understanding of messages.	• Review of materials / messages provided by NFIP • Interviews with NFIP and Project Impact staff and communications/ marketing subcontractors • Review of materials / messages from co-op advertising programs • Review of previous NFIP communication research • Interviews, surveys, and / or focus groups with target audience members.	• Conduct activities as listed in "How to Get Information" • Determine what messages are sent though which channels • Identify message tailoring by audience segment • Assess audience recognition of messages • Assess audience reactions to messages (e.g. attitudinal and behavioral) • Assess audience comprehension of messages • Elicit audience suggestions for message dissemination	• Audience confirmed awareness of messages • Audience reactions to messages • Recommendations based on research with target audience members • Recommendations based on message processing theories and advertising principles (e.g., elaboration likelihood, expectancy violations, and factors that affect risk perceptions).	• Model 7- National Flood Insurance Marketing and Communications

Question	Information	How to Get	Tasks Involved	Outcome Measures	Logic Model

	Needed Information				Reference
d) What impacts, if any, has hazard identification (e.g., mapping of flood-prone areas) had on public awareness of the NFIP's mitigation and insurance elements?	• Target audience awareness of hazard identification (i.e., maps) • Target audience awareness of NFIP mitigation efforts • Target audience awareness of NFIP insurance elements • State and local policies regarding notification of flood areas • Local flood hazard dissemination methods (e.g., newspapers, radio) • News stories relating to NFIP mapping	• Review of any existing FEMA documents regarding the promotion of flood hazard identification • Surveys and / or interviews with target audiences • Key informant interviews with local and state officials • Review of state and local flood policy documents	• Conduct activities as listed in "How to Get Information" • Determine what policies require notification of the public • Determine how state and local officials notify lenders, the insurance industry, and the public about flood hazards which have been identified • Identify typical patterns of communicating flood hazard information (i.e., what entity communicates what information to whom) • Assess the relationship between NFIP mapping efforts and knowledge of flood insurance • Assess the relationship between NFIP mapping efforts and knowledge of mitigation measures • Collection and analysis of news articles related to hazard identification, mitigation, and / or insurance	• Number of people who know about flood hazard mapping • Number of people who have ever seen a flood hazard map • Number of people who know they live in a SFHA • Number of people who believe living in a SFHA justifies buying flood insurance • Correlation of awareness of maps with knowledge of NFIP mitigation and insurance elements. • Correlation of presence of maps with news stories relating to the NFIP. • Recommendations for better use of flood hazard maps • Recommendations for methods of notifying stakeholders about flood risks and newly identified flood hazards	• Model 7- National Flood Insurance Marketing and Communications

Question	Information	How to Get	Tasks Involved	Outcome Measures	Logic Model

	Needed Information				Reference
e) Does the NFIP have an impact on the public's* perception and understanding of the risk of financial losses from flooding? If so, what is that impact? • * It would be beneficial to get similar information from lenders and agents as they are often the first line of communication	• Coverage provided by NFIP • Number and type of NFIP messages relating to financial loss. • Target audience perceptions and understanding of the risk of financial loss from flooding	• Review of prior marketing and communications documents • Interviews with NFIP staff and or NFIP communications / marketing consultants • Analysis of NFIP messages which relate to financial loss due to flooding • Surveys, interviews, and / or focus groups with members of the public*	• Conduct activities as listed in "How to Get Information" • Analyze research data to obtain perceptions of risk of financial loss • Assess NFIP messages for financial loss information • Analysis of research data to quantify perceptions of the risk of financial loss • Analysis of relationship between message reception and understanding of financial loss from flooding • If broadened to include other audiences, confederate calls to agents and lenders to confirm/disconfirm self-reported data	• Qualitative information regarding messages disseminated • Audience perceptions of the risk of financial loss with and without flood insurance • Audience coping strategies with and without flood insurance • Number of policies sold correlated to public understanding • Number and type of messages received correlated to the public understanding	• Model 7- National Flood Insurance Marketing and Communications

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference

Question	Information Needed	How to Get Information	Tasks Involved	Outcome Measures	Logic Model Reference
f) Is the NFIP providing understandable communications about flood insurance that promote the risk allocation program? How can the NFIP improve its risk communications (better targeting, distribution or promotion strategies) within the current funding allocated to this process? Under what circumstances would an increase or decrease in this funding be appropriate?	• Messages related to risk allocation program • Current NFIP audience segmentation methods • NFIP information about how information is distributed / promoted • Target audience understanding of messages (how risk is allocated) • NFIP current level of funding for promotion • Past reasons for increases or decreases in funding	• Requests for information from NFIP, WYO insurance agencies, etc. • Review of NFIP / FEMA documents related to risk allocation and premium assignment • Discussion / interviews with NFIP staff • Surveys, interviews, and / or focus groups with target audiences	• Conduct activities as listed in "How to Get Information" • Develop and understanding of how risk is allocated and insurance rates determined • Evaluate messages for risk allocation content • Analyze data to assess target audience understanding of messages • Identification of circumstances where changes in funding allocation are appropriate	• Reported understanding of risk allocation messages • Understanding of risk allocation information in relation to message reception • Assessment of the relationship between understanding risk allocation and support for the NFIP • Recommendations for possible changes in communication / marketing funding • Recommendations for improving NFIP risk communication	• Model 7- National Flood Insurance Marketing and Communications

Question	Information	How to Get	Tasks Involved	Outcome Measures	Logic Model

	Information Needed				Reference
g) How effectively does the NFIP convey to property owners that the risks of floods are real and that flood insurance may be a better risk management alternative than reliance on disaster relief after a flood? Do prospective policyholders perceive this to be a valid assumption?	• Methods of communication with property owners • Messages sent to property owners regarding flood risks and disaster relief • Perception of property owners and potential policy holders regarding NFIP flood insurance and disaster relief • Cover America I and II campaign information	• Review of NFIP documents • Interviews with NFIP / FIMA staff • Requests for information from NFIP and WYO agencies • Review of information provided on NFIP website • Surveys, interviews, and / or focus groups with property owners and prospective policyholders	• Conduct activities as listed in "How to Get Information" • Confirm NFIP criteria for measuring effectiveness • Determine what messages have been sent to property owners and prospective policy holders • Determine how messages have been sent to property owners and prospective policy holders • Conduct content analysis of messages regarding flood risks and disaster relief • Determine audience reactions to messages advocating flood insurance over disaster relief	• Number of messages relating flood insurance to disaster relief • Analysis of message content (e.g., appeal, benefits conveyed, source of information) • Attitudes, knowledge, and behaviors of prospective and current policy holders • Reactions of property owners and prospective policy holders to messages	• Model 7- National Flood Insurance Marketing and Communications

Question	Information	How to Get	Tasks Involved	Outcome Measures	Logic Model

	Information Needed				Reference
h) How can the NFIP's terminology (e.g., "100-year flood") be improved to communicate with the public more effectively? What is the best way to convince federal, state, and local governments to change their flood terminology?	• The public's current understanding of NFIP terms (e.g. 100-year flood) • Materials which use the "100-year flood" term or other terms which are likely to be misunderstood	• Review of past reports which address communication activity • Review of NFIP/FEMA glossaries • Interviews with local code officials • Focus groups with target audiences, including traditionally underserved audiences	• Conduct activities as listed in "How to Get Information" • Develop new concepts, comparisons, and linkages which convey risk (e.g., 100 year flood = 1% annual risk of flooding) • Assess new concepts, comparisons, and linkages in focus groups with FEMA staff, lenders, local code officials, and the public • Literature review of other attempts by federal agencies to change terminology • Interviews with government agencies and local officials to investigate strategies for changing the terminology used	• Number of promotional materials that use terms with and without an explanation of those terms • Assessment of the public's understanding of selected terminology • Alternative concepts, comparisons, and linkages which convey risk messages • Target audience reactions to new concepts, comparisons, and linkages • Recommendations for affecting a change in flood terminology	• Model 7- National Flood Insurance Marketing and Communications

Question	Information	How to Get	Tasks Involved	Outcome Measures	Logic Model

	Needed Information				Reference
i) What is the role of the media in educating the public about rational policy choices with respect to the NFIP? Does the media provide information that is helpful to those making decisions about purchasing flood insurance or implementing mitigation measures? What has been the effect of the Cover America campaign on the public's support for and understanding of the NFIP?	• Current use of the media by NFIP, lenders, and WYO agencies • Broadcast and print news stories related to the NFIP • Cover America I and II strategic plans	• Interviews with FIMA staff and / or NFIP communication / marketing contractors • Document review (including Project Impact documents where appropriate) • Collect news stories related to the NFIP • Review of information provided on the website • Surveys, interviews, and / or focus groups with target audiences	• Conduct activities as listed in "How to Get Information" • Identify/confirm NFIP criteria for "rational policy choices" • Reach agreement with NFIP on policy choices to be measured • Content analysis of news stories • Assess reactions to key Cover America II communication components • Ask those who purchased or who are contemplating purchase about their use of media sources, what they recall, and how useful the information was for them • Ask state and local officials about their use of the media and how the media influences their decisions	• Number of news stories related to flood insurance purchasing and mitigation measures • Measure of confirmed awareness of the Cover America campaigns • Attitudes toward Cover America II campaign messages • Target audience use of media as a source of flood related information • Information about state and local officials use of the media in disseminating messages	• Model 7- National Flood Insurance Marketing and Communications

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

Question (a):

1. How successfully, if at all, has the NFIP been in communicating its insurance component to insurance companies, agents, adjustors, the lending industry, and the public?
2. Has the NFIP been successful in communicating the program's current goals and requirements for floodplain management to these audiences, state and local governments, the building industry, and other concerned groups?
3. How can the NFIP assess changes in its relative success with its communications over time?

Related NFIP Goals:
The first two parts of Question (a) relate to the second (II), third (III), and fourth (IV) NFIP goals. The second goal concerns informing government agencies, lenders and the public about flood hazards. The third goal is to reduce the frequency and adverse effect of flooding, which requires communication of NFIP goals and requirements for flood plain management. The fourth goal concerns minimizing the amount of disaster assistance required through risk assessment, risk communication, floodplain management, mitigation and insurance.

Related Logic Models:
Logic Model 7 - National Flood Insurance Program Marketing and Communications

Illustrative Previous Studies:
A review of the literature reveals that several studies have been employed to evaluate the overall effectiveness of the NFIP and the messages aimed at the awareness and understanding of the program's goals (including insurance, floodplain management, and other mitigation measures). Many of these projects were contracted by FEMA as independent assessments of various components of marketing/communications campaigns.

KRC Research and Consulting (1995) produced a qualitative report that describes the perceptions of four key target audiences. Lenders, realtors, community officials, and Advisory Board Committee members were asked to discuss their feelings about the insurance industry, and to report what they had learned about the public's opinions, based on their professional contact with them. Respondents reported that the insurance component of the program (including eligibility requirements, cost, and coverage) was not sufficiently communicated to the public, and that "ignorance [of flood insurance] is the reason many people do not have adequate flood insurance" (p. 24). These findings are echoed in another 1995 KRC study, which reports the results from a quantitative investigation into the attitudes toward and understanding of flood insurance and the NFIP among consumers and business decision-makers (BDMs).

Gallup and Robinson, Inc. (1999) found a somewhat different result in their evaluation of the NFIP. The evaluation report specifically addresses the Cover America campaign, and attempts to find any changes in awareness, attitudes, or behavior that could be attributed

to the efforts of the campaign. Cover America's messages, the goals of which focus on "improving awareness of and attitudes about the [NFIP] and flood insurance [and] stimulating demand for flood insurance…" (FEMA, 1999 - #218) are specifically analyzed. The conclusions emphasize improvement since the findings of earlier research. They point out that the "total contracts in force…ha[d] increased by… 22.3%" from October 1995 to June 1998, and that much of this growth can be attributed to the campaign generally, and to media spending specifically. This is a clear indication that FEMA's mass media marketing has affected the effectiveness of the communication efforts of the NFIP.

In addition to focusing on flood insurance, the NFIP attempts to communicate the importance of responsible floodplain management. A few of the reviewed studies consider this issue, and offer evaluations of the NFIP's efforts to convey guidelines, penalties, and incentives. Kaiser, et al. (1987) recognize the importance of communicating floodplain information in their examination into the influence of policies on the decision making process of landowners, developers, and building owners. Their conclusions stress the importance of targeting these three groups in communicating floodplain information because of their early role in the development process, and the greater likelihood that they would take mitigation action in response to appropriately presented messages.

More recently, the Association of State Floodplain Managers, Inc. (2000) analyzed floodplain management policies and programs, and offered recommendations to improve the effectiveness of floodplain regulations. The report points out five areas that the authors see as requiring specific attention. In addition to procedures designed to refine existing policies, "enhanc[ing] education, training, and public awareness" is listed as one of the major responsibilities of practitioners in the future. Specifically, the authors suggest that it is important to "find clearer ways to communicate flood risk so that it is meaningful to citizens and communities, thus enabling them to take appropriate steps to reduce risk and damage" (vii).

Selected Approach:
The selected approach necessitates determining what the NFIP wishes to communicate to each of its target audiences, including but not limited to consumers, business decision makers, lenders, insurance agents, local government officials, and non-native English speakers. To determine this, interviews with NFIP staff and a review of NFIP and NFIP related documents will be performed. Subsequently, a survey which builds upon existing research with be conducted with a representative sample of each of the target audiences. Insurance agents, adjustors, representatives of the lending industry, and members of the public will be asked about information contained in flood insurance messages. These questions will assess knowledge and beliefs about flood insurance, attitudes toward flood insurance and the NFIP, and behaviors related to the purchase of polices and implementation of mitigation measures. For example, questions will be designed to measure:

- Perceived availability of flood insurance
- Perceived need for flood insurance

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

- Perceived risk of loss due to flooding
- High and low risk floodplain areas
- Website usage
- Toll-free number usage
- Awareness of information resources
- Purchase of flood insurance
- Attitudes, knowledge and behavior measures over time
- Questions about message exposure
- Discussion of flood insurance
- Knowledge of flood mitigation measures
- Experience with floods or other natural disasters

State and local officials, developers, homebuilders, and land and property owners will be asked the same questions, and additional questions designed to investigate knowledge of and attitudes toward the NFIP's requirements for floodplain management.

The survey is designed to assess how much knowledge, etc. from NFIP messages, as determined by the researchers, is held by target audience members. The proposed survey may serve to answer more than one of the NIFP marketing/communications questions. If combined with another area of inquiry, it is likely that the survey will build upon existing and currently proposed Cover America II research by only briefly addressing those areas that have already been researched and primarily concentrating on under-researched areas such as coping strategies, having ever experienced flooding, perceptions of the risk of loss due to flooding, etc. Following the survey, focus groups or in-depth interviews with selected target audience members will allow the researchers/evaluators to explain the results of the survey and assess the success of the NFIP's marketing and communication efforts.

In the process of conducting the above evaluation, the researchers/evaluators can create an instrument and protocol by which the NFIP can assess changes in the relative success of its communications over time.

Strengths: The selected approach is relatively straightforward. It will provide both an assessment of how well the NFIP is communicating information about flood insurance and requirements for floodplain management and provide data that may be used as a baseline against which future research may be compared. The consideration of multiple target audience groups allows for a comprehensive assessment.

Weaknesses: Determining a representative sample for each of the NFIP target audiences will be difficult. Demographic factors and factors such as geographic region, community size, and past flood losses must be taken into consideration. Obtaining voluntary participation, the subjective nature of surveys, and problems with recall are inherent in research similar to the proposed approach.

Feasibility of conducting the proposed task: Medium

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

Relative priority: High
Studying the effectiveness of communications intended to convey fundamental messages of the program is vital to the evaluation process. This inquiry and the associated evaluation approach investigate the communication activities of major components of the program. In addition, consideration of multiple target audience groups allows for a comprehensive assessment of the NFIP's communication activities, and permits comparisons between groups.

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

Question (b):

1. What messages has the NFIP sought to deliver to program constituents?
2. Has the information raised awareness of the NFIP or increased the number of flood insurance policies sold?
3. How effectively and efficiently have the messages of the NFIP been communicated to target audiences?
4. What is the relationship between knowledge of benefits and attitudes toward the NFIP?
5. What strategies are the most and least cost-effective in raising awareness?
6. Are there better strategies for communicating the NFIP's messages?

Related NFIP Goals:
Question (b) most directly relates to the II, III, and IV NFIP goals. These goals call for the notification of stakeholders and risk communication to reduce individual hardship and the amount of disaster assistance required for recovery.

Related Logic Models:
Logic Model 7 - National Flood Insurance Program Marketing and Communications

Illustrative Previous Studies:
The literature reviewed does not produce an obvious list of messages strategically targeted at the specific audiences of the NFIP. It is evident, however, that NFIP messages are both numerous and complex, and that in many cases, a single message may be disseminated to multiple audiences. Leonard (1999) attempts to divide some of these messages by broad audience category through his explanations of the NFIP. In the first of two volumes published the same year, Leonard focuses on information that is crucial to decision makers and public officials, as well as messages aimed at lenders and insurance agents. The second book, however, details messages of the NFIP that target the general public and potential buyers. Both volumes provide informational and instructional material, and list resources where specific audiences can learn more.

FEMA provides its own description of the NFIP's messages through an explanation of the Cover America I and Cover America II campaigns. These marketing and advertising campaigns were initiated (in 1995 and 1999) as national programs with the goals of increasing awareness about the NFIP, improving attitudes toward the NFIP and flood insurance, and increasing policy sales. Documents produced to illustrate these messages are available on FEMA's website.

KRC Consulting has evaluated the success of the advertising campaigns. KRC's studies explore the understanding and perceptions of flood insurance by multiple audience segments, including business decision-makers, insurance agents, lenders, and consumers (KRC, 1995;KRC, 1998; KRC, 1999). The research findings indicate that the NFIP communication efforts have increased the public's knowledge about flood insurance and its benefits. However, they also report that a high proportion of people still do not believe

that a flood is likely to happen to them and that floods occur outside high-risk areas. Many who do recognize that floods might occur where they live do not believe that they will result in serious damage (KRC, 1995; Pasterick et al, 1998; KRC, 1999). In general, these findings suggest that, despite relative success in communicating the benefits of flood insurance, these advantages may not be strong enough motivation for the general population to be persuaded.

In 1999, FEMA enlisted Gallup and Robinson, Inc. to perform an evaluation of the Cover America strategy. Gallup concluded that generally, the Cover America campaign was effective in delivering relevant messages to consumers, which "produced significant policy growth," and influenced awareness and attitudes. They also concluded that increased awareness resulted in a more positive image of the NFIP during the advertising time frame. The *Call for Issues Status Report* (2000) reveals that the Federal Insurance and Mitigation Administration's (FIMA's) overall marketing plan for the NFIP, which includes Gallup's appraisal of Cover America, acknowledges the success achieved in raising awareness, but also "recognize[s] that misinformation still exists" and that they will continue to work "to improve public understanding regarding flood insurance" (p. I-3-6).

A Bozell and KRC report (2000) also found that the Cover America campaign has been effective in raising awareness of flood insurance and the need for it, but their investigation went further by looking at the specific media and vehicles used to disseminate and promote messages. A comparison of the different media distribution channels (e.g., TV, radio, direct mail, print) indicated that direct mail has been the most cost-effective in generating new policy sales.

Unlike the insurance component, it appears that studies of the public's perception of mitigation efforts have been limited. In general, the discussion of mitigation efforts in previous studies tends to be more theoretical and rely on simulated computer models. For example, Kleindorfer & Kunreuther (2000) used a simulated risk mitigation measure to examine how property owners and insurers would react to an increase in mitigation efforts. Findings suggest that community members would see significant savings, but existing governments programs dull the incentives for individuals and institutions to prepare for natural disasters. However, recent population growth in hazard-prone areas and inadequate enforcement of building codes has resulted in greater losses from natural disasters. In some cases, this has caused the insurance industry to promote *more* mitigation efforts (Kunreuther, 1996). In addition, a FEMA (2000) report suggests that Project Impact has been successful in getting *communities* to protect themselves from natural disasters by pointing out the value of mitigation. Unfortunately, many potential *consumers* expect that federal disaster assistance will adequately provide for post-flood recovery, and many are simply misinformed, which contributes to a relatively low market penetration for NFIP (Pasterick, Kunreuther, & Roth, 1998).

These studies report the effectiveness of message promotion from many different perspectives, and concentrate on a variety of media and audiences. While they tend to show consensus in attributing success to the NFIP's communication efforts, none of the

studies offer an evaluation that incorporates message awareness and influence with target audience and promotional strategy. In other words, none of the reviewed research appears to correlate awareness of a specific message or set of messages with media planning (e.g., ad frequency and budget data) information. The reviewed research also does not seem to take the mandatory nature of flood insurance purchases into account for those policy holders who both live in a special flood hazard area and have a loan or mortgage from a federally insured lender.

Selected Approach:
The first priority in this method is to define "effective and efficient" in the context of this inquiry, and to identify and/or develop criteria for measuring success as it relates to message communication. This information may be available by reviewing FEMA documents, and may be supplemented through consultation with FIMA marketing personnel.

- Effective will likely refer to those messages (1) adopted by the population and (2) cited as a reason why someone purchased flood insurance.
- Efficient will likely refer to (1) the largest number of gross rating points (GRPs) per cost and/or (2) the cost per lead (CPL)

Following this, an inventory of messages is needed to assess what is being sent to whom, when those messages are being sent, and through what channels.

- We know who, to some degree, the messages are targeted toward (Bozell has targeted all insurance salesmen and all homeowners aged 35 and over), but could gather greater information about magazine readership, television programming, and especially direct mailings. This is especially the case for direct response television advertising where a given advertisement may be bumped in favor of an advertiser willing to pay full price for a time slot.
- There has not been a content analysis of the NFIP messages to determine what ideas have most often sent, what tone is most often employed, and how often other framing devices have been used. Examples of things that might be interesting to look at include the use of people in the pictures, whether or not flood insurance prevents flooding as opposed to helping someone recover from them, and whether a given material has been translated into another language.

Conversations with FIMA staff and document review may provide marketing strategy and media buy information that will be useful in tracking activities and comparing messages in terms of awareness and market penetration, stratified by audience segment. Learning the Gross Rating Points (GRPs), as well as more specific reach and frequency data, purchased for an advertisement, for example, will assist evaluators by aiding in the correlation of a variety of variables with particular characteristics of a media market. This information also allows for comparison among markets that have varied level of exposure, and can supplement self-reported awareness by compensating for limitations in the memory of respondents. Document review and discussions with FIMA personnel will also be important in determining the number of flood insurance policies in force.

- FIMA should be able to provide information about policies in force, but only Bozell knows the reach and frequency of the advertisements aired or the

circulation of advertisements printed. The information needed to do a thorough analysis is not present in existing reports. More specifically, we need:

- Media buy information by advertisement, vehicle, and time rather than just those data chosen for inclusion in post-buy reports.
- The reports currently available list information by quarter and do not differentiate between specific advertisements (for example, it appears that FIMA is currently using 2 or 3 different TV advertisements) or specific television programs or magazines.

The next step in our approach involves conducting surveys with representative members from each target audience (e.g., homeowners, insurance agents, lenders) from both riverine and coastal communities, from homeowners both those residing inside and outside of SFHAs. It might also be possible to conduct the survey online at the NFIP website for some of the sample (e.g., insurance agents or lenders). The survey will ask questions designed to assess awareness of specific flood insurance messages (e.g., risk, mitigation measures, building standards), attention to advertising and promotional vehicles, attitudes toward flood insurance and the NFIP, and the likelihood of taking steps to follow suggestions presented by the NFIP, including purchasing flood insurance. Specific topics that will be examined in the survey include:

- Perceived benefits and costs of flood insurance
- Attitudes, knowledge, and behaviors related to mitigation measures
- Attitudes toward alternative dissemination strategies (e.g., brochures to schools)
- Beliefs about protection through other insurance (e.g., homeowners insurance) and federal relief assistance
- Beliefs about the likelihood of flooding and incurring loss
- Coping mechanisms used after natural disasters
- Awareness and understanding of broadcast and print ads (and PR activities)
- Media habits and sources of information for disaster relief
- Demographics (including SES and SFHA status)

To cost-effectively address the questions presented in B, we propose to sample three coastal communities and three riverine communities. While this approach is not as comprehensive as a census or even a larger sampling scheme, it will allow for comparisons between the groups and provide a means of checking data from one location against the other areas where similar flood hazards exist. Ideally, the three coastal communities will be from the east, west, and Gulf coasts, and the riverine locations from the Midwest, the South, and either the Northwest or New England areas. The locations chosen can be investigated in conjunction with other aspects of the NFIP evaluation.

After selecting the sites, data from Transamerica or another company which provides flood rating information can be used to determine which areas reside in an SFHA and which do not. Then, individual household level data and data from lenders and insurance agents can be collected (Note that data from lenders and insurance agents likely can not be split by SFHA designation, but whether or not the individual respondent lives in an SFHA and whether or not they believe a large proportion of their clients reside in a SFHA can be investigated). If incentives are provided, agents and lenders may be willing

to take an Internet based survey. Homeowners may also require an incentive, but are unlikely to be able to complete an Internet survey (agents and lenders may be reasonably thought to have Internet access either at home or at work, but the same can not be said for any large group of homeowners). Obtaining information from homeowners can be done in a number of ways. While not as cost effective as a telephone survey, survey teams going house to house will likely obtain the most completed questionnaires with the least amount of respondent bias (the response rate is higher than that of telephone surveys). As a random selection of clusters and systematic sampling within each cluster (i.e., standard demographic research techniques) may be cost prohibitive given the need to purchase flood rating information, random selection techniques would be used with each residence within the areas selected.

- Two research teams of two people (4 people per location) would be sent to or hired in each location for approximately two weeks. During the first week each team will sample either a SFHA or non-SFHA location, during the second week, the teams would switch locations. Switching team assignments will reduce the amount of researcher bias present in the sample.

Although some of the data to be collected will build on the assessments of previous or soon to be conducted studies, (e.g., KRC's quantitative tracking reports), the proposed research explores several topics that are important, yet remain unevaluated (e.g., coping mechanisms, the mandatory nature of flood insurance). Moreover, multivariate analysis to causally link and control for the mandatory nature of flood insurance, sources of information, or attitudes toward insurance in general requires that data be collected from the same audience members. For example, although beliefs among homeowners about the likelihood of flooding may be explored in another inquiry, in order to investigate the association between coping strategies and these beliefs while controlling for living in a SFHA requires that the information come from the same individuals at the same time. The information collected from the surveys will be examined in light of the cost of each strategy and the impact each strategy has on knowledge, attitudes, and behaviors related to flood insurance.

Focus groups and/or in-depth interviews may be used for formative research prior to the construction of a quantitative survey and may also be conducted after quantitative surveys to further clarify the results. The analyses will allow for judgments to be made about the cost, efficiency, and effectiveness of specific promotional techniques, and will afford evaluators the ability to draw conclusions and make recommendations about current and alternative approaches to delivering messages.

- Focus groups and/or interviews will only be conducted if greater information is needed. Given that there are 6 locations, at least 12 focus groups and 36 long distance telephone calls should be budgeted.
- The focus groups will attempt to narrow the focus of any investigation so that the important issue surrounding a given group can be explored (e.g., Gulf coast homeowners who live in an SFHA) rather than collecting qualitative information that can be compared across the target groups and selected areas.

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

- **Strengths:**

The major strength of this approach lies in its comprehensive nature, and the fact that it accounts for a variety of methods of message delivery and encompasses a broad range of target audiences. In addition, the approach yields information from both quantitative and qualitative perspectives.

- **Weaknesses:**

A major weakness in this methodology involves the inherent complexity of the NFIP's communication messages and the difficulty in segmenting the information by target audience. Another possible weakness in this approach may result from the social desirability response bias that may arise with the self-reports obtained in the survey.

Feasibility of conducting the proposed task: Medium

Relative priority: High
Determining what messages exist and their relative importance, their method of dissemination, and their intended audience is fundamental to understanding the effectiveness of a communications campaign.

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

Question (c):

1. How can the NFIP encourage its target audiences to increase their attention to the messages that it delivers?
2. What messages have been most attended to, remembered, and/ or acted on by different target audiences?

Related NFIP Goals:
Question (c) most directly relates to the II and IV NFIP goals. These goals call for the notification of stakeholders regarding flood hazards and risk communication to reduce individual hardship and the amount of disaster assistance required.

Related Logic Models:
Logic Model 7 - National Flood Insurance Program Marketing and Communications

Illustrative Previous Studies:
In 1995, KRC Research and Consulting conducted a quantitative study that assessed the attitudes of consumers and business decision-makers (BDMs) about flood insurance and its components. Goals were to propose recommendations for the type of messages that would be most effective in reaching the target audiences, and to provide a benchmark that could be used for evaluation after a campaign was launched. The researchers found that at the time of the study, most consumers did not understand the risk of floods and did not understand what flood insurance can do to alleviate some of that risk. Recommendations for creating campaign messages emphasize using an expert to promote the idea that flooding is a real risk, and using a real victim of a flood to illustrate the benefits of flood insurance.

These findings were echoed in a qualitative study of community officials that KRC also conducted the same year. The *Qualitative Research Report: In-Depth Interviews with Community Officials, Lenders, Realtors and Advisory Board Committee Members* (1995) expresses the views of representatives from various constituencies. KRC found that respondents recognized "ignorance about the danger of flooding and its consequences… [as] the overwhelming determinant of whether people buy flood insurance or not" (p. 26). The constituencies also agreed that someone who had experienced a flood would be the most appropriate spokesperson for a campaign, "particularly the 'ordinary person' who people can relate to" (p. 26).

A 1998 KRC report considers the effectiveness of the ongoing NFIP communications campaign by giving an account of the opinions of insurance agents, a target audience group who, through their business dealings, has access to the attitudes of multiple other groups. One judgment from the study highlights the feeling that even after several years of campaigning, many consumers did not appreciate their risk of flooding, or did not believe that purchasing flood insurance was beneficial relative to its cost. The agents interviewed noted that the most effective tactic for educating the public would be to continue to emphasize risk and to promote a depiction of flood insurance as affordable. Respondents also stated that the most effective message dissemination methods for *information* were through the use of company materials (e.g., brochures). Word of mouth,

followed by print and television ads were preferred for *increasing awareness* among consumers.

KRC's 1999 *Quantitative Evaluative Report IX* details the findings from the ninth wave of the tracking study that was initiated by the benchmark report produced in 1995. This report serves as a comprehensive examination of messages targeted at a broad range of target audience groups. Advertising awareness was assessed along with specific message recall. This information is useful in determining whether or not a campaign was effective in promoting intended information and increasing understanding. Sixteen percent of consumers were able to recall a flood insurance advertisement, compared to 17 percent of BDMs. Although these numbers fluctuated during the tracking study, awareness remained significantly higher than at the beginning of the Cover America campaign. As expected, "most of the consumers (65 percent) who recall[ed] the ad remember seeing it on TV" (p.9), while an even higher percentage of BDMs (78 percent) claimed to recall a television advertisement. The messages most remembered by both consumers and business decision makers were directed at increasing general awareness ("Flood insurance is available") and explaining risk ("Floods can happen to you"). Messages receiving less attention (but still eliciting some reaction) stressed that floods are destructive and that they can happen anywhere (p.10).

Evaluator suggestions advised that maintaining the current message emphasis and structure was important, and should be supplemented with increased spending for advertising "so that even more people see the ads" (p.23). Additionally, KRC recommended that consumer reaction be facilitated by including a single toll-free telephone number (as opposed to the previous inclusion of a message to contact an agent also) in order to bring "people one step closer to finding out more information, removing the need to decide which source to call" (p.26). To change beliefs about the difficulty in getting flood insurance, the report suggested that a concentrated effort should be made to inform insurance agents about the risk of flooding so that they will provide relevant information to their clients. Instructions for writing and servicing flood insurance policies should accompany informational materials, and should underscore the idea that it is not as difficult as they may think.

Selected Approach:

The first step in our recommended approach would be a thorough review of established documents, like those produced by KRC Research and Consulting, and Gallup and Robinson, Inc., which provide analyses of the communication efforts of FEMA and the NFIP. This information offers a history of advertising and educational campaigns and can offer insight to the transformation of these campaigns over time. Additionally, data from these reports are vital to assessing which messages have been effective with specific target audiences. Materials from the co-op advertising program should also be reviewed to gain a more inclusive view of communication activities.

Interviews, surveys, and focus groups with target audience members will supplement information gleaned from the referenced sources, and will provide up-to-date data on the current status of the campaign. The design of this methodology may be modeled after existing studies to assist in comparative measures but should also account for any gaps in

this research. Interviews with key informants at FEMA and FIMA may provide marketing plans that can segment specific message by target audience so that surveys can appropriately and efficiently investigate awareness of and attendance to particular concepts. Surveys conducted with a representative sample of target audience members will focus on general campaign and advertising awareness along with individual message attendance and message influence. Focus groups, also comprised of target audience members, will be used to gauge audience reaction to specific messages, and for assembling more detailed information related to the effect of the messages.

Strengths: Strengths of this method involve the consideration of previous studies, which can assist in development of measures for evaluation and provide a basis for comparison of message effectiveness. In addition, this method attempts to systematically assign messages to their attended audience for evaluation, streamlining the approach while determining if information is being efficiently distributed. Finally, aspects of this approach can be used to evaluate other inquiries as well.

Weaknesses: A major weakness of this approach is the possible difficulty in allocating messages by target audience. However, reviewing media plans and speaking with the advertising contractor account, research, and creative staff may overcome this deficiency.

Feasibility of conducting the proposed task: Medium

Relative priority: Medium
The inquiry into message type will investigate method of appeal (e.g., humor, fear), the channel used for dissemination (by number and type), and the theme employed. This information, along with that garnered from investigations into message dissemination methods, provides the basis for establishing effectiveness criteria.

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

Question (d):

1. What impacts, if any, has hazard identification (e.g., mapping of flood-prone areas) had on public awareness of the NFIP's mitigation and insurance elements?

Related NFIP Goals:
Question (d) most directly relates to NFIP goals II and III. These goals call for the notification of stakeholders regarding flood hazards and the reduction of the frequency and adverse consequence of flooding.

Related Logic Models:
Logic Model 7 - National Flood Insurance Program Marketing and Communications

Illustrative Previous Studies:
While several studies address the impact that the NFIP and the availability of flood insurance have had on development in hazardous (i.e., flood prone) areas, we are not aware of any research that specifically investigates the influence of hazard identification on attendance to the messages promoted by the NFIP. Douglas and Hall (1986) establish that there was little communication of risks in the earliest stages of the program, and that this contributed to a continuous rise in the national flood damage totals. Their conclusion that a systematic method of communicating flood risks would reduce losses by increasing hazard awareness (and thereby promoting flood insurance purchase and other mitigation measures) was executed in later stages of the program with mass media and education campaigns like Cover America I and Cover America II. However, the effects of risk identification activities like mapping of flood prone areas have not been explicitly analyzed.

The gap in this research has also been recognized by FEMA. Their 2000 *Opportunities to Enhance Compliance with Homeowner Flood Insurance Purchase Requirements* suggests that tackling the issue of seemingly low compliance levels should include an extensive inquiry by FIMA. The proposed analysis suggests surveying areas that have been impacted by a flood event, and would pay particular attention to identifying uninsured property that had been added to a Special Flood Hazard Area after a flood map update. Learning whether or not business decision makers (BDMs), lending agencies, and homeowners were aware of the new flood risk status might help explain why there was some failure to comply with mandatory insurance purchase requirements. This methodology would also attempt to find breaks in communication between regulatory agencies, lending institutions, and the public. No evidence was found that this study had been conducted.

Some evidence was discovered, however, that supports the idea that the public does not have sufficient information about hazard identification and the floodplain mapping procedures. The *Technical Mapping Advisory Council Final Report* (2000) summarizes the accomplishments and recommendations of an advisory group that was created through the 1994 National Flood Insurance Reform Act. Four primary recommendations emerged from their five years of work, including one related to increasing awareness of hazard identification methodology. The Council suggests that it is necessary to "buil[d]

constituent interest and public support for modernizing the mapping program" (p. 2). They conclude that a well-designed program can "educate the public about the risks posed by flood hazards and the values and benefits of good mapping…" (p. 4).

The Call for Issues Status Report (2000) also addresses the task of notifying property owners in areas where flood zone changes occur. In response to an inquiry into the feasibility of notification via different channels, FEMA indicated that FEMA's website, the Compendium of Map Changes, local newspaper notices, and free public awareness materials were primary sources of zone change information. In addition, they report that FIMA "feels the best way to get the word out to residents of areas where zone changes occur is through local officials" (p. I-3-1).

Selected Approach:
The selected approach involves a process of learning about NFIP messages related to hazard identification and mitigation, determining which policies require public notification, and discovering the relationship between NFIP efforts to communicate this information and actual public awareness of risk, insurance, and mitigation measures.

Through a systematic review of news stories and announcements covering hazard identification events and the corresponding mitigation recommendations circulated through various media (e.g., NFIP mapping practices, newly created local hazard maps, flood-proofing measures), a general inventory of data related to risk communication efforts can be compiled. This information will substantiate published views of the NFIP and flood insurance in general that offer support for the program and criticism of it. Document review may supplement this collection by providing examples of materials (e.g., mat stories, brochures, announcements) used in the notification effort. Subsequently, researchers can begin to identify patterns of message dissemination, first by establishing the process by which information is passed through the ranks, from decision makers at the federal, state, and local official levels to various target audience groups, including insurance agents, lenders, WYO companies, the public, and other agencies and organizations. Next, it will be necessary to determine the course of action that each entity takes to communicate important messages to its target audience(s) during normal and emergencies situations.

The communication plans of individual communities can be assessed through conversations/interviews with key informants within decision-making establishments. These interviews should be completed with representatives from organizations at each step of the communications process in order to learn what methods they use for disseminating hazard identification and risk mitigation messages. Also important are the audiences to which their messages are targeted and the approaches they use to assess the effectiveness of messages and message channels. The conversations should also include inquiries into existing policies for notifying the public about hazard identification updates and should ask about current channels used for notification.

The next step in evaluating the effect of hazard identification on public awareness of the NFIP involves conducting a survey of target audience members. Each target audience

will be questioned about their knowledge of a variety of hazard related topics. These inquiries will address the mapping procedures of flood-prone areas, the ways to obtain information about a property's flood zone status, the methods of mitigating flood damage, and the role that flood insurance has in preparing for disaster. Additionally, it is important to assess the influence that hazard identification (and the communication of mapping activities) has on the awareness of the NFIP's insurance and mitigation elements. This may be measured by directly asking respondents about the impact that learning about a hazard has had on their behavior, or by estimating the relationship by relating hazard and risk mitigation awareness with flood insurance purchase behavior.

Questions should focus on an individual's knowledge of general hazard identification issues, and on their awareness of both personal and community-wide risk. An attempt will be made to assess whether or not respondents know that flood maps exist and whether or not they have actually seen a map. Personal risk awareness can be assessed by exploring an individual's knowledge of the flood-rate status of property and by investigating whether or not they have purchased or intend to purchase flood insurance. Additionally, survey inquiries will measure awareness of flood mitigation efforts at the individual and community level.

Strengths: An advantage of this approach stems from the assembly of news stories and documents related to hazard identification. This information will fill a gap in the literature, and when gathered in the systematic method proposed, will provide an extensive knowledge base for deciphering the communication efforts used to disseminate information. Additionally, coupling this information with that garnered from interviews of target audience members will not only gauge awareness of risk-related messages, but will assist in the creation of a communication matrix to explain the process of communication diffusion.

Weaknesses: While comprehensive and systematic in its approach, this methodology involves a somewhat complex course that incorporates information from widely dispersed sources. In considering the process of gathering news stories especially, it is necessary to recognize that the information will have to be gathered from a variety of suppliers that may not be easily accessible. In addition, this process will have to take into consideration the fact that dissemination methods have changed over time, and will have to account for these changes by providing historical communication data as well. The complexity of gathering and assembling this information may be very time consuming, and could result in additional cost.

Feasibility of conducting the proposed task: Low – Medium
The feasibility of conducting the project as outlined in the approach may be low due to the difficulty in gathering information from such a wide range of sources, using such a broad range of methods. It may become easier, however, if the target audiences interviewed were limited in region and in type (e.g., lenders, agents, and the public only) or by restricting news information collected to a manageable period (e.g., one year).

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

Relative priority: Low

The primary purpose of hazard identification seems not to be to influence the public at large, but to aid local, state, and federal officials in creating and enacting policies that lead to community mitigation activities and the purchase of flood insurance. Investigating the influence of hazard identification messages would lead to a more thorough picture of the program. However, because it is likely that hazard identification has its greatest impact on the public through local, state, and federal officials requiring the actions of lenders, insurance agents, and developers, a direct study of the public's reactions may not be efficient.

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

Question (e):

1. Does the NFIP have an impact on the public's perception and understanding of the risk of financial losses from flooding?
2. If so, what is that impact?

Related NFIP Goals:
NFIP goal IV, which concerns minimizing the amount of disaster assistance required for recovery and reducing individual hardship due to flooding is most relevant. The goal calls for risk communication to communicate the risks, financial and otherwise, of flooding.

Related Logic Models:
Logic Model 7 - National Flood Insurance Program Marketing and Communications

Illustrative Previous Studies:
Other than KRC's series of *Quantitative Evaluative Reports*, there appear to be very few studies that have looked specifically at the NFIP's impact on the public's perception and understanding of the risk of financial loss from flooding. The *KRC Qualitative Report: In-depth Interviews Conducted with Direct Agents, Lenders and WYO Agents* in 1995 reported that many people in the general public do not understand how insurance works and have difficulty understanding the difference between flood insurance and government emergency aid. Additionally, the report said that the respondents felt that ignorance of risk was the overwhelming determinant of whether or not someone purchased insurance. (Note that communication and other behavioral research would say that knowledge alone is often insufficient to facilitate behavior change, and the reasoning behind the knowledge solution would not explain why many people fail to renew/maintain flood insurance). Several flood insurance purchase models (e.g. Kriesel & Landry, 2000) use loss as part of their theoretical reasoning, but fail to examine perceived potential loss as a factor in purchase decisions. It appears that this is the case because the models are constructed from secondary demographic data, often at a zip code or larger level of analysis, rather than eliciting primary data from households.

The KRC *Quantitative Evaluative Report IX* (1999) reports that approximately 35 percent (35%) of consumers and 29 percent (29%) of business decision makers are unaware of the NFIP; thus changes in knowledge may not always be attributed directly to the NFIP. It may be that much of the NFIP's impact may be through messages delivered by the lending and insurance industries rather than direct exposure to the NFIP's marketing/communications efforts. In this regard, however, it is worth noting that the KRC *Qualitative Report: In-depth Interviews…* indicates that there is a lack of knowledge of the NFIP in the insurance and lending industries (Note: there is no indication of the extent of knowledge gaps, perhaps misunderstanding may be a better term in that is seems that both know of the NFIP, but have incorrect beliefs.). One lender interviewed reported that they do not inform homeowners about the benefits of flood insurance, only that they are in a flood zone and need flood insurance.

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

KRC's *Quantitative Evaluative Report IX* notes that 60 percent (60%) of consumers know that their homeowner's policy does not cover flood damage and 59 percent (59%) of business decision makers know that their comprehensive policies do not cover flood damage. These percentages reflect a greater than ten percent increase since the 1995 Benchmark study. However, 64 percent (64%) of consumers in 1999, down from 67 percent (67%) in 1995, did not know that flood insurance covers both the contents and structure of a home. Additionally, only 22 percent (22%) of the consumers and 20 percent (20%) of the business decision makers interviewed (about one-third of which reside in a high flood risk area) believe that a flood is likely and that it is likely that they will incur loss from the flooding. What remains unclear from the research is how either target audience interprets some of the terms (e.g. "loss," "major loss," and "inexpensive") used in the Quantitative series. Similarly, it is unclear what level of a flood constitutes a "natural disaster" in the minds of the respondents. It may be that only those major floods that make the news are considered a natural disaster, or that floods are only natural disasters when they personally affect the respondent.

The FEMA/NFIP website provides several comparisons between disaster relief and flood insurance. Several authors have suggested that disaster relief may be a disincentive to purchase flood insurance, but the Quantitative IX report found that only three percent (3%) of consumers expected the government to pay for losses due to a natural disaster. However, this number increased to 35 percent (35%) when the question specified that the president declared their community a disaster area. Contrary to the idea that relief provides a disincentive, Browne and Hoyt (2000) found a positive correlation between the purchase of flood insurance and receipt of disaster assistance, so the exact relationship between relief and flood insurance is unclear. Kriesel and Landry (2000) also suggest that disaster relief is unlikely to reduce NFIP participation. Another item of note in the Kriesel and Landry study is that only eight percent (8%)of the people surveyed elected to buy flood insurance on their own (i.e., were not required to do so) and that demand for flood insurance is relatively price insensitive.

There appears to be little research on how the insurance industry views their own risk of financial or other loss, as opposed to how policyholders view the risk of loss, from flooding. While some insurance agents may be unconcerned about flooding since they know that losses due to flooding are not covered under most homeowner's policies, others may believe that keeping their customer's long-term interests in mind involves advocating for the purchase of flood insurance. Similarly, some insurance agents may believe that advocating flood insurance is worth their while because getting people to buy flood insurance reduces the likelihood of arguments and dissatisfaction arising from the denial of flood loss claims. Others may not feel that the return on selling flood insurance policies is not worth their effort.

There does not appear to be any research on how the lending industry views their risk of financial loss from flooding. The documents reviewed provide no indication how much loan officers or other lending officials see a lack of flood insurance as a threat. Some lenders may not perceive a problem since the homeowner is responsible for paying their loan regardless of flooding, but others may view the lack of insurance as a threat that

increases the risk of default and puts the bank's collateral at risk. Additionally, it is unclear how much federally insured lending institutions are concerned about meeting the requirements for loans to those in SFHAs set out by Congress.

As federally insured lenders are responsible for ensuring that homeowners in SFHAs maintain flood insurance and the insurance industry is, perhaps, the first point of contact for renters and those homeowners who are not in SFHAs, the perceptions of the insurance and lending industries are important to examine. Although not specifically addressed in the evaluation question, the selected approach discusses research with both lenders and insurance agents.

Selected Approach:
The first step in our recommended approach is a review of messages disseminated by the NFIP. Reports, such as the *Quantitative Evaluative* series by KRC, and any qualitative evaluations, including message pretesting data, should be reviewed for content and appropriateness for the intended target audience. Interviews with NFIP staff and/or NIFP communications/marketing contractors and consultants will ensure that all relevant messages are considered. Issues such as topic, benefits, readability, supports, cultural sensitivity, tone (e.g., humor, fear, authoritarian) will be assessed for each message. Those messages that concern the risk of financial loss can then be examined with focus groups of policyholders and potential policyholders. Focus group participants can not only provide in-depth information about how the message is perceived, they can also, prior to discussion, take a short survey to indicate if they have heard the information before and where they heard it. In addition to discussing the messages, focus groups should explore how consumers think they would handle the effects of a flood if they had insurance and how they would handle a flood if they did not. Coping strategies other than insurance have not been a part of the current NIFP research agenda, so new data in this area should illuminate reasons why one person may perceive an important threat or see a high risk of flooding, but their immediate neighbor may not. Future messages may then be designed to show how flood insurance will allow consumers to better make use of their existing coping strategies (e.g. they would have to borrow less money from relatives, they would have money to do their own house repairs, etc.).

After assessing the messages related to the risk of financial loss, the data may be used to create close-ended questions designed to quantify the results. Quantifying the data will allow correlations between exposure to NFIP messages to be calculated, which can improve the understanding of the risk of financial loss, and the effect on the purchase of flood insurance. The questions designed to assess perceptions and understanding of financial risk would be given to people living within and outside of special flood hazard areas in a survey designed to assess a combination of NFIP areas of interest. This survey could be mass mailed or administered by telephone. Both types of survey, mail and telephone, can be conducted via random selection, but lists of homeowners and residences (phone directories) may be used as well. Potential biases can arise when using lists, but they seem unrelated to whether or not someone purchases flood insurance. For example, social workers and probation officers often do not list themselves in directories,

but the fact that they are not listed has little to do with whether or not they may own a house in a SFHA and how they perceive and understand the financial risks of flooding.

Although not specifically called for by Question E, it would be advantageous for the NFIP to examine lender and insurance agent perceptions and understanding of the risk of financial losses. As federally insured lenders are responsible for ensuring that those in SFHAs have flood insurance and agents are the most likely source of information for renters and those not in SFHAs (and perhaps those within them as well) it is important to examine how they portray the need for insurance to members of the public. A similar approach to that recommended for members of the public, i.e. focus groups followed by a survey, would provide the information necessary. This information can be confirmed by having a research confederate call insurance agents and lenders. The confederate would ask about the necessity of flood insurance, where to buy it, where to get more information, and the benefits of carrying it and risks involved in not having it. Only a few telephone calls will be made in each area where data are collected. The purpose of the calls is not to provide another large data set to be statistically analyzed, but to qualitatively confirm or disconfirm the findings of the surveys through examination of data from more natural interactions/settings than would be found with focus group or survey research. Confederate reports would be completely confidential; all identifying information would be stripped from the data; and all identifying information would be destroyed at the end of the evaluation period.

Strengths: One of the strengths is that both qualitative and quantitative information about the messages and level of understanding of the risks of financial loss would be provided. Additionally, this approach can be combined with other marketing/communications questions and other areas of inquiry. Incorporating lenders and insurance agents in the evaluation framework fills in gaps in the existing body of knowledge.

Weaknesses: The three-step procedure advocated (review, focus groups, quantitative survey) requires more time and greater funds than less comprehensive procedures. As the use of a confederate involves deception, a greater amount of time may be needed to obtain human subjects committee approval.

Feasibility of conducting the proposed task: High

Relative priority: Low
According to the *Quantitative Evaluative Report IX*, most people already agree that purchasing flood insurance is a good idea, but largely do not perceive themselves at risk. Of higher importance is how lenders and insurance agents, often the first line of information, portray the risk of financial loss to members of the public.

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

Question (f):

1. Is the NFIP providing understandable communications about flood insurance that promote the risk allocation program?
2. How can the NFIP improve its risk communications (better targeting, distribution or promotion strategies) within the current funding allocated to this process?
3. Under what circumstances would an increase or decrease in this funding be appropriate?

Related NFIP Goals:
Question (f) most directly relates to NFIP goal IV, which calls for risk communication to reduce individual hardship and the amount of disaster assistance required for recovery. Also related is goal II, which calls for stakeholder notification of hazards. Neither goal explicitly deals with promoting an understanding of the risk allocation program, but the messages that relate to both goals would also facilitate and understanding of how risk is allocated.

Related Logic Models:
Logic Model 7 - National Flood Insurance Program Marketing and Communications

Illustrative Previous Studies:
It does not appear than any study has specifically examined the "understandability" of NFIP communications in relation to risk allocation. Several documents however, including the KRC *Qualitative Research Report: In-depth Interviews with Community Officials, Lenders, Realtors and Advisory Board Members* (1995) and the KRC *Report on In-depth Interviews Conducted with Direct Agents, Lenders, and WYO Agents* (1995) indicate that there is misunderstanding about NFIP terminology (e.g., 100-year flood) but do not address communication about different rates due to base flood elevation, construction, location, etc. The 1995 KRC report on community officials states that, with the exception of advisory board members, the respondents had difficulty in understanding the breakdown and terminology used for the different zones. One realtor also said that "the maps are very confusing, so I don't pay any attention to them." (KRC, 1995).

The *NFIP Call for Issues Status Report* (2000), while indicating that the NFIP is working on providing "a 'public friendly' and easily understood terminology system" (pg. I-3-9), including technical information (e.g. the 100-year flood = 1% annual risk of flooding) and flood zone nomenclature (A, B, V, etc.), indicates that there is also a need for more information about the amounts and reasons for loss. The report also indicates that FEMA is in the process of simplifying its *Flood Insurance Manual* and that a task force has recently completed an effort to convey flood insurance policy information in easily understood plain language. The language, according to the report, should be used as of 12/31/00, but does not indicate if the language has been approved by FEMA's legal counsel or been pretested with members of the public. The few more current documents examined do not discuss this change in language.

The Progression Group's *Analysis of Marketing ROI* (return on investment) report (2000) indicates that for every $1,000 spent on NFIP advertising, an average of 13 policies were

sold (policies in force). The analysis did not find significant relationships between spending on advertising, awareness, and sales. The report, while finding that legislation (in 1994 and 1997) does have an impact, did not take the mandatory nature of flood insurance into account. In their research, Kriesel and Landry (2000) found that only 8 percent of their sample purchased flood insurance on their own (i.e. it was not required).

The *Market Opportunity Scoring Model*, also by Progression (2000), investigates flood insurance coverage in relation to demographic variables, but also does not control for the mandatory nature of flood insurance for those who live in SFHAs. The report indicates that the same regions of the country that have higher levels of coverage continue to have, based on the profiles created, the largest potential for growth. Many of the intuitive findings (e.g., those with more education and income are more likely to purchase flood insurance) are reasonable guidelines for marketing, but the report does not reveal why some people do not carry flood insurance.

While the KRC *Quantitative Evaluative Report* series has clearly documented that consumers find flood insurance to be expensive, several studies, such as Browne and Hoyt (2000) and Kreisel and Landry (2000), have found that demand for flood insurance is relatively price inelastic, thus economic price strategies may not be effective. Other "pricing" strategies (e.g. psychological, familial) should be explored. As many people interviewed for the Quantitative Report IX said that they would be most likely to ask their insurance agent about flood insurance, and because many people first hear about their need for flood insurance from a loan officer, it is important to investigate the efficacy of agents and lenders to deliver understandable information about the NFIP and determine what flood insurance benefits appeal to consumers.

Selected Approach:
The selected approach has several components. The first step is a review of messages/information that refer to how risk is allocated. Prior to being able to assess how the NFIP can improve its communications vis-à-vis risk allocation, it is necessary for the researchers conducting the evaluation to understand how risk is allocated (i.e. how location, construction, base flood elevation, mitigation, etc. affect the risk assessment and premium determination process). This understanding will assist in both determining the level of understanding present in selected target audiences and in determining the best way to convey needed additional information. A review of NFIP documents and dialog with NFIP staff will be used to facilitate a good understanding of the risk allocation process.

The second step is an appraisal of materials that attempt to explain how risk is assessed and allocated. First, materials will be requested from the NFIP, Write Your Own (WYO) insurance agencies, and other sources FIMA staff may identify as important providers of information. Next, it is necessary to determine how many materials exist; then it is necessary to determine whether or not the information they present is accurate; and finally it is necessary to assess how well they relate to each other and explain how someone's rate of insurance is assessed. This assessment will help form judgments

relating to whether or not insufficient or unclear materials are the cause of ignorance or misunderstanding.

In-depth interviews or focus groups with local policy makers/code officials and developers will be used to assess their understanding of the risk allocation process and exposure to any of the NFIP messages or information relating to risk allocation. A related series of focus groups with loan officers, insurance agents, and members of the public will best facilitate the evaluation of their understanding of the risk assessment process and general exposure to NFIP messages. In addition to an assessment of target audience understanding, the research will investigate what messages people relay to others and what types of messages seem effective in raising the awareness of the risk of flooding and the importance of flood insurance.

In addition to determining what information is being conveyed, it is also necessary to examine how that information is being sent (i.e. by what channels and what approach, e.g., rational versus emotional approaches) and what opportunities exist for feedback to reach the NFIP). In order to provide recommendations for improving the NFIP's risk communications within the current funding allocated, the costs of each method and individual promotional efforts are needed. Rather than attempting to quantify the return on investment of individual methods, the goal is to examine the value, in terms of its potential to facilitate understanding, for each method. Qualitative research with the selected target audiences should be collected in more than one location, ideally at several locations in each geographic region (e.g. pacific, west south central, mountain, etc.) in both flood prone and non-flood prone areas.

As there are no widely accepted ways to determine when an increase or decrease in funding for communication efforts is appropriate, the researchers/evaluators will identify methods that appear effective and those that are not. In doing so, the researchers/evaluators must take a range of messages, behaviors, target audiences, and channels of dissemination into account. For example, to maintain coverage, it may be more effective to communicate with lenders about the risk of flooding, need for flood insurance, and legal penalties than to target individual homeowners.

Strengths: The proposed approach will provide answers for an area where less research has been conducted. The proposed qualitative research provides answers to critical questions and will assist the NFIP in designing both educational materials and marketing messages. It will identify gaps in knowledge and misunderstandings amongst a wide range of target audiences and assess the best ways to deliver information to those groups. Generally speaking, qualitative data can be collected faster than large-scale quantitative data. In conducting research to answer this question, other questions, especially question H, may be investigated.

Weaknesses: The proposed research does not provide numbers that can be generalized. Not all messages may be available for review. The number of in-depth interviews and focus groups, as well as the number of participants in those groups and the many target

audiences involved, slows the data collection process and increases the cost. Additionally, it may be difficult to get some target audiences to participate.

Feasibility of conducting the proposed task: High

Relative priority: Medium
This question addresses several areas of importance. People are more likely to accept the necessity of flood insurance and act in a manner that limits the risk of flood damage if they understand why it is necessary.

Evaluation Design Narrative
Area of Inquiry Number 6 – Marketing and Communications

Question (g):

1. How effectively does the NFIP convey to property owners that the risks of floods are real and that flood insurance may be a better risk management alternative than reliance on disaster relief after a flood?
2. Do prospective policyholders perceive this to be a valid assumption?

Related NFIP Goals:

The communication efforts discussed for this question relate to NFIP goal IV, which suggests the need to minimize the amount of disaster assistance and reduce individual hardship through risk assessment, risk communication, floodplain management, mitigation, and insurance.

Related Logic Models:

Logic Model 7 - National Flood Insurance Program Marketing and Communications

Illustrative Previous Studies:

Overall, findings suggest that flood knowledge has steadily increased among consumers in more recent years. For example, one study conducted with residents in a flood-vulnerable community in Pennsylvania revealed that most respondents had little knowledge of the cause of floods and what could be done to protect themselves and their property (Lave & Lave, 1991). The authors concluded that there was little effective communication about the nature and magnitude of flood risks or of measures people can take to lessen physical and economic loss. More recently, knowledge about flood insurance has increased through the Cover America campaign. Although there is room for improvement, since the 1995 benchmark study, both consumers and business decision-makers have grown significantly more aware of the following (KRC, 1999):

- Floods occur more now than in the past
- Homeowners and comprehensive policies do not include flood insurance
- Not all natural disasters are declared federal disaster areas by the President
- Even if the President does not declare a disaster, the NFIP will cover a person if they have flood insurance

Despite this increase in overall flood knowledge, only 22% of all consumers and 20% of all business decision-makers surveyed believed that a flood is likely and that they will likely incur losses or suffer damages from a flood (KRC, 1999). Thus, perceived personal risk might explain the lower than expected penetration rate for NFIP. Another reason that has been cited for lower than expected NFIP penetration rate is the reliance on federal disaster relief rather (Pasterick, 1998; Kriesel & Landry, 2000). That is, persons may feel that the federal government would provide financial assistance after a natural disaster and as result have not taken any personal action. This result, however, is inconsistent with the finding that most consumers feel that insurance companies (42%) should be primarily responsible for the financial effects of a natural disaster rather than the federal government (15%) (KRC, 1999).

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Taken as a whole the reviewed literature provides inconclusive findings about how effective the NFIP has been in conveying to property owners that flood insurance is a better alternative than federal disaster relief.

Selected Approach:
Our recommended approach involves a process of reviewing NFIP documents, including relevant information from the FEMA website. We also recommend conducting key informant interviews with NFIP staff to identify informal and formal measures for evaluating communication effectiveness. These background sources will provide guidance on how to develop effectiveness measures for communicating with potential policyholders regarding federal disaster relief and the added benefits of flood insurance.

We also propose to conduct a content analysis of NFIP messages that are disseminated to property owners regarding flood risk and disaster relief. Messages distributed by the NFIP, WYO companies and agents will be included in the analysis. The content analysis will provide insight into what types of information are being conveyed to the public regarding flood insurance and federal disaster relief. The following types of information will be examined:

- Number & type of messages that refer to federal disaster relief
- Relative emotional appeal of messages
- Number & type of benefits conveyed for flood insurance
- Number and type of channels for message dissemination
- Message source (e.g., FIMA, WYO companies)

Findings from these sources will provide a better understanding of how and what NFIP currently communicates regarding federal disaster relief and NFIP benefits and whether or not the NFIP, and FEMA in general, is providing mixed messages to it's target audiences.

The next step in evaluating how effective NFIP has been in communicating flood risks and the benefits of flood insurance in relation to federal disaster relief involves conducting focus groups with potential policyholders. Four to six focus groups will be conducted with both consumers and business decision-makers that do not currently have flood insurance. The focus groups will be geographically distributed and include a mix of high and low risk areas. The following topics will be explored with potential policyholders:

- Beliefs regarding federal disaster relief
- Past use of federal disaster relief assistance
- Understanding when, how, and what is covered by federal disaster relief
- Perceived flood risk now and in the future
- Perceived damage from floods
- Understanding of what NFIP includes
- Perceived value of NFIP in relation to federal disaster relief
- Awareness & recall of NFIP messages

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- Reaction to messages

Findings from the focus groups will provide guidance on what message appeals would prove to be most effective for communicating with potential policyholders in the future.

Strengths: The primary advantage of this approach is that it provides an indication of how effective the NFIP has been in conveying the benefits of flood insurance in relation to disaster relief. The perspective of the NFIP, as well as what information is actually conveyed in the messages will be analyzed. In addition, understanding the beliefs that potential policyholders have regarding federal disaster relief is another source of information. Because beliefs regarding disaster relief may be hindering market penetration for NFIP, findings from this evaluation will provide insight into how to more effectively communicate with the public the benefits of NFIP in relation the disaster relief.

Weaknesses: Although the approach is comprehensive, this methodology involves a somewhat complex course that incorporates information from widely dispersed sources. Further, the complexity of gathering and assembling this information may be very time consuming, and could result in additional cost.

Feasibility of conducting the proposed task: High

Relative priority: Medium
This question represents an important NFIP issue and the answer would have significant implications for positioning NFIP in the future.

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Question (h):

1. How can the NFIP's terminology (e.g., "100-year flood") be improved to communicate with the public more effectively?
2. What is the best way to convince federal, state, and local governments to change their flood terminology?

Related NFIP Goals:
The issue of terminology relates to all NFIP goals that require communication with and the understanding of stakeholders. NFIP goal II addresses the informing government agencies, lenders, and the public of flood hazards. NFIP goal IV discusses minimizing disaster assistance and reducing individual hardship through risk assessment, risk communication, floodplain management, mitigation, and insurance.

Related Logic Models:
Logic Model 7 - National Flood Insurance Program Marketing and Communications

Illustrative Previous Studies:
Two of KRC's qualitative reports (*Report on In-Depth Interviews Conducted With Direct Agents, Lenders and WYO Agents* and *Qualitative Research Report: In-depth Interviews With Community Officials, Lenders, Realtors and Advisory Board Committee Members* both from 1995) and the *Quantitative Evaluative Report* series indicate that the public misunderstands NFIP terminology. Pasterick (1998) also states that there is a problem with the term 100-year flood. Floodplain residents interpret the term chronologically and thus harbor a false sense of security. For example, these residents might think that if they had a flood 10 years ago they are very unlikely to have another for 90 years.

It is worth noting that the KRC's *Quantitative Evaluative Report IX* (1999) says that 76 percent of consumers and 82 percent of business decision makers correctly answer false to: "If you live in an area called a "100-year flood zone" that had a flood 10 years ago, you will not have another flood until approximately 90 years later." However, this result may be due more to people knowing that nature is not predictable and not that there is a 1 percent annual chance of flooding. If a recent flood did not affect someone, it would not be uncommon for him or her to experience a sense of relief because they feel that the chances of such a flood happening again in the near future are slim. The question used assesses the presence of one incorrect understanding of the term 100-year flood, but does not reveal what percentage of the sample has correct knowledge.

The *NFIP Call for Issues Status Report* (2000) acknowledges that there is some confusion over NFIP terms. According to the report the NFIP is working on providing "a 'public friendly' and easily understood terminology system" (pg. I-3-9). The new terminology will reflect more easily understood terms that refer to technical information (e.g. the 100-year flood = 1% annual risk of flooding) and flood zone nomenclature (A, B, V, etc.). This recommendation for changing flood zone terms was also suggested by the advisory board members interviewed for KRC's *Qualitative Research Report: In-depth Interviews With Community Officials, Lenders, Realtors and Advisory Board Committee Members* (1995).

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FEMA's responses to recommendations provided for the *Call for Issues* (2000) indicate that it has, in the past, attempted to simply the *Flood Insurance Manual* and intends to revise the *Flood Insurance Manual* and individual NFIP physical flood insurance policies in easily understood, plain language. According to the report, FEMA should have begun using the language as of 12/31/00 (approximately seven months after the report was issued). Whether or not the language has been approved by FEMA's legal counsel or pretested with members of the public was not stated in the report.

Compared to the 100-year flood terminology, little research has been conducted regarding other NFIP terms. The advisory board members interviewed for KRC's *Qualitative Research Report: In-depth Interviews With Community Officials, Lenders, Realtors and Advisory Board Committee Members* suggested that the NFIP's flood zone risk rating letters be changed to words that better capture the level of risk inherent to that area. This recommendation indicates that there may be undocumented problems with other NFIP terms.

Selected Approach:
The recommended approach begins with a review of internal NFIP documents that address its communication activities, including, but not limited to any documentation about message pretesting and the public's comprehension of messages. Following this, selected materials may be assessed via interviews or focus groups with members of the public. The purpose of this assessment is to identify additional areas where difficulties with terminology may reside; for instance, members of the public may not understand the difference between a flood hazard and a flood disaster.

After identifying areas for improvement, we propose to:

- Develop alternative concepts and terminology for communicating risk (e.g. 100 year flood = 1 percent annual risk of flooding; high/medium/low flood risk areas),
- Find risk comparisons that consumers feel convey a serious risk of flooding (e.g. there is a greater chance of your house being damaged by flooding than by fire), and
- Identify linkages that associate more feared threats with floods and the utility of flood insurance (e.g. flood insurance covers flooding caused by hurricanes).

The concepts, comparisons, and messages developed will be pretested via focus groups with FEMA staff, insurance agents, loan officers, and the public. Local code officials, because they are fewer in number in any given location will be interviewed to assess their understanding and reactions to the above. These interviews and focus groups will take place in four or five areas chosen to represent certain flood characteristics (e.g., coastal, riverine) and cultural aspects related to geography (e.g., Midwest, New England). Ideally, three focus groups for each target audience will be held in each location. As Spanish is the second most commonly spoken language in the United States, and three of five states (Florida, California, Louisiana, Texas, and New Jersey) which comprise 70 percent (70%) of all NFIP policies in force have large Spanish speaking populations, items identified as being better understood or well-liked through the first set of focus groups will be translated and back-translated into Spanish (Flanigan, Isaacs, Marlett, & Sebald, 2000). These items will then be pretested with focus groups composed of native Spanish

speakers from the various target audiences. As Spanish speakers are not equally distributed across the country, mixed focus groups will be used in selected locations.

In addition to proposing new concepts, we also propose to examine some of the existing messages disseminated vis-à-vis theories of how people process risk information (e.g. Slovic, 1987; Gregory & Mendelsohn, 1993; and Weinstein, 1999). For example, research on risk has found that "natural risks" are far more acceptable than "man-made" ones, and risks that are egalitarian are more acceptable than those that disproportionately affect a group. The purpose of this review is not to pretest existing messages, but to determine from a theoretical perspective, areas where NFIP messages may be improved. Empirical testing of new messages, by the NFIP or a contractor/consultant preparing to initiate a communication campaign, may then determine whether or not NFIP messages can benefit from the use of new terms or alterations of existing ones. An example of the application of risk communication theory is that messages that say "everyone is at risk" may actually be less effective than specific messages because saying that everyone is at risk reduces the overall perceived threat and the likelihood that someone will perceive themselves to personally be at risk.

Interviews with other federal agencies (e.g., the Army Corps of Engineers, Environmental Protection Agency, and the U.S. Soil Conservation Service) and state and local code officials will allow us to identify the best ways for the NFIP to encourage others to change their terminology.

Strengths: The strength of the recommended approach is a comprehensive assessment of NFIP terms that allows for stakeholders to suggest new terms and explore comparisons of meaning. The recommended approach will provide the NFIP with tools to develop new messages for promoting flood insurance. Each target audience has different perceptions and viewpoints. Working with each target audience increases the likelihood of creating a vocabulary that facilitates smooth lines of communication and an easy understanding of the pros and cons and whys and wherefores of flood insurance. This approach may be combined with other research questions.

Weaknesses: The recommended approach does not quantify the extent of problems relating to the NFIP's terminology, nor does it ensure that any new terminology will be effective in increasing the percentage of the population covered by flood insurance. Pretesting concepts with a wide variety of groups in different geographic locations is more costly than other more limited testing procedures.

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Feasibility of conducting the proposed task: High

Relative priority: High
Although there is little documentation that widespread misunderstanding of NFIP terms exists, problems related to terminology seem to be an underlying assumption in many reports and the basis of some of the recommendations provided for the *Call for Issues* report. Because new ways of communicating risk and the importance of flood insurance will be identified, the question and the answers to be obtained are of considerable priority. The *Qualitative Research Report: In-depth Interviews With Community Officials, Lenders, Realtors and Advisory Board Committee Members* (1995) states that "the vast majority of those who own flood insurance do so because they have to, not because of perceived risk" (p. 25). Furthermore, the "Quantitative Evaluative Report IX" reports that only 22 percent (22%) of consumers both believe that a flood is likely and that they are likely to incur loss or suffer damages. When taking this information into consideration, it is clear that the NFIP should continually seek out better ways of communicating risk to the public. The recommended approach seeks out those better ways of communicating risk.

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Question (i):

1. What is the role of the media in educating the public about rational policy choices with respect to the NFIP?
2. Does the media provide information that is helpful to those making decisions about purchasing flood insurance or implementing mitigation measures?
3. What has been the effect of the Cover America campaign on the public's support for and understanding of the NFIP?

Related NFIP Goals:

Question (i) most clearly relates to NFIP goal IV. This goal calls for risk communication, as well as risk assessment, floodplain management, and insurance, to reduce individual hardship from flooding and the amount of disaster assistance required for recovery from floods. Risk communication, as well as insurance promotion and the need for proper floodplain management, may all involve the media.

Related Logic Models:

Logic Model 7 - National Flood Insurance Program Marketing and Communications

Illustrative Previous Studies:

A review of the literature reveals that the media's role in educating the public with respect to flood events is several-fold. It appears that in many cases, the media has the responsibility of educating people about mitigation against possible floods, warning residents about potential disaster situations, describing the progress of storms, reporting the effects after the event, and providing information to assist in the recovery. In addition, FEMA, lenders, and agents use the media as a vehicle for advocating various messages through advertising and promotional spots.

Many of the available studies focus on the function of the media as an information source, both before a flood event and after a disaster hits. Garner (1996) explores this notion in an article that analyzes both local and national press coverage of "The Great Flood of 1993." She found that while there were several common themes among national and local coverage, local media was more likely to concentrate on the way the flood affected individuals, families, and communities than national media. In addition, local media was more likely to provide information about dealing with flood losses, and was more positive in their portrayal of the NFIP than the national media, which was inclined to suggest that it was a "Federal bailout."

Other studies also consider the role of the media in providing information about disasters. In "Riding out the Storm: Public Evaluations of News Coverage of Hurricane Andrew" Driscoll and Salwen (1996) interviewed South Florida residents to gauge their opinions of news coverage surrounding the 1992 hurricane. The authors investigated both the trustworthiness and perceived expertise of various media (newspapers, television, and radio), and compared them to the trustworthiness and expertise of other information resources (e.g., word-of-mouth). They concluded that most of the respondents found mass media (especially television) to be an effective means of gathering factual information to help them deal with both the storm and aftermath.

The other major role of media is as a channel for disseminating advertising and the promotional information of the NFIP. In a 1998 study, Kunreuther examines factors influencing decisions regarding the purchase of insurance. He feels that the media can affect changes in the belief that flood insurance is not a wise investment relative to risk by offering consistent, vivid messages that explain the benefits of insurance in protecting a property against natural disaster. These findings are validated in a return on investment (ROI) analysis conducted by Progression Group (2000). The evaluators concluded that advertising is a major factor in prompting property owners to consider flood insurance. Results from their assessment indicate that 21 percent of new policy sales can be attributed to advertising, and that every 1000 dollars in advertising generates an average of 13 new policies sold. Perhaps most telling is one of the report's conclusions, which suggests that "sales volume would begin to decline without continuing ad pressure" (p. 16).

FEMA and FIMA have acknowledged the importance of using the mass media to promote their messages, as evidenced by the Cover America I and Cover America II campaigns. A document on FEMA's website (1999) describes the campaigns and their various components, including the preferred channels for delivering information. Television, print, radio, and the Yellow Pages provide the primary vehicles for paid advertising, followed by direct mail, which is "used to provide information directly to homeowners who don't have flood insurance." Gallup and Robinson, Inc.'s evaluation of the campaign (1999) found that in general, the campaign "has had a positive impact," and that "there has been a clear impact of the media spending on total contracts [sold]."

More recently, PR News (1997) reports that in preparation for a period of potential flooding, FIMA supplemented the Cover America ad campaign with additional mass media spots to increase awareness and address questions about the NFIP. FIMA concentrated its additional effort on high-reach media including television spots, radio announcements, and news conferences.

Finally, one reviewed article considers the emergence of new media as a way to distribute information about floods. Emani and Kasperson (1996) looked at FEMA's use of e-mail and the World Wide Web to distribute information during the 1995 hurricane system. Their exploratory study found that of the 184 e-mail messages FEMA issued, 138 were hurricane-related. This provides useful information in establishing a baseline for the recently popularized medium, as at the time of their research, few systematic studies had investigated the appropriate type of flood messages for the Internet. Emani and Kasperson, however, did not examine the impact of FEMA's messages on increasing awareness or changing behavior.

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Selected Approach:
The first step in the selected approach involves a review of broadcast and print news stories covering flood events. The stories can be assessed using content analysis to categorize the messages within each news feature. The assessment will determine their role in promoting a particular idea (e.g., awareness, information, attitude, behavior change) through the use of framing and the extent of coverage provided.

Next, a systematic review of NFIP documents should be coupled with interviews of key informants at FEMA and FIMA. The information gleaned from these activities may include marketing plans that will detail the use of programmed (i.e. planned) media in publicizing the messages of the NFIP. The review will also assist in segmenting specific messages and channels by target audience so that survey instruments can be appropriately and efficiently created. Additionally, a review of information provided on FEMA's website will be conducted to contribute to the creation of a comprehensive overview of media (including new media) activities. This methodology will include a review of the Cover America media campaigns, and of supplemental materials produced as part of the NFIP.

In addition to conversations with FEMA and FIMA personnel, in-depth interviews with state and local authorities will be conducted in an attempt to assess how much, and in what ways, they use the media to educate and/or inform their constituents. It may also be beneficial to inquire about their reasons for using the methods they use, and their beliefs about the effectiveness of the media and other dissemination methods.

Surveys and focus groups with consumers, lenders, and insurance agents will be designed to assess the use of various media sources as a means for getting information on flood related topics. In-depth interviews will be used to investigate the same information from state and local officials. Furthermore, specific messages may be investigated, along with the media used to carry them. Surveys conducted with members of the public should explore the influence of individual media sources on decisions associated with making rational policy choices (e.g., purchasing flood insurance, implementing other mitigation measures). Asking respondents what they recall from a specific vehicle and how useful the available information was in helping them reach a conclusion may assist in assessing the value of the medium and the message. Focus groups are appropriate for collecting more detailed information from target audience members, and may aid in accounting for gaps or inconsistencies. The results from these surveys and focus groups, and the in-depth interviews with officials, may be compared to results from any pre-tests (e.g., copy testing previous to advertising launch) as reported in existing documents (if available), and interviews conducted with FEMA's marketing personnel and the advertising contractor.

Strengths: A major advantage of this approach is that it incorporates both quantitative and qualitative information. This provides a complete assessment of the influence of the campaign, and of effective media channels in particular. By including a content analysis of both news stories and advertising messages (segmented by medium), the method accounts for the multiple roles that the media plays in disseminating flood insurance

information, and for both programmed and unprogrammed messages that may be delivered through media channels. Additionally, the efficiency of this design is relatively high, as aspects of this investigation may be combined with other questions that use a similar approach.

Weaknesses: The proposed approach is fairly complex in its design, which may result in additional time and cost. It may also be difficult to segment messages by media vehicle, and to calculate relative effectiveness. However, the review of media plans and conversations with FEMA marketing staff may alleviate some of this difficulty. Additionally, the survey portion of this approach relies heavily on respondent recall of past messages.

Feasibility of conducting the proposed task: Medium

Relative priority: Medium
Along with assessing message types and dissemination methods, learning the means by which people get important information is a vital part of a media evaluation activity.